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THE

PRINCIPAL DISEASES

OF THE

INTERIOR VALLEY OF NORTH AMERICA.

A

SYSTEMATIC TREATISE,

HISTORICAL, ETIOLOGICAL, AND PRACTICAL,

ON THE

PRINCIPAL DISEASES

OF THE

INTERIOR VALLEY OF NORTH AMERICA,

AS THEY APPEAR IN THE

CAUCASIAN, AFRICAN, INDIAN, AND ESQUIMAUX VARIETIES OF ITS POPULATION.

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EDITORS' NOTICE.

SOME time after the death of the lamented author of the following pages, his manuscripts were placed in our hands to prepare for the press. In performing this duty we discovered that although he had bestowed a vast amount of care on the matter and its arrangement, evident in the numberless additions at different periods to the former, and alterations of the latter, as well as in the entire remodelling of many chapters, yet but little had been left in a condition to place in the printer's hands. In the work of correction and completion, we have endeavored to present the author as nearly as possible in the dress and manner he would have chosen himself. The great labor involved in thus editing upwards of three thousand pages of manuscript can scarcely be realized except by those having experience in such matters. By far the larger portion of this labor was performed in the intervals begrudgingly afforded by extensive practice, and with an importunate sense of the expediency of publication on the earliest possible day,—circumstances not favorable to the completion of the undertaking in the manner we should have desired.

September, 1854.

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THE

PRINCIPAL DISEASES

OF THE

INTERIOR VALLEY OF NORTH AMERICA.

Book Second.

FEBRILE DISEASES.

PART FIRST.

AUTUMNAL FEVER.

CHAPTER I.

NOMENCLATURE, VARIETIES, AND GEOGRAPHICAL LIMITS OF AUTUMNAL FEVER, TOGETHER WITH THE TOPOGRAPHICAL AND CLIMATIC CONDITIONS UNDER WHICH IT PREVAILS.

SECTION I.

NOMENCLATURE.—VARIETY.—IDENTITY.

I. NOMENCLATURE.—In different parts of the Interior Valley, the fevers, which we are about to study, are known under the names—autumnal, bilious, intermittent, remittent, congestive, miasmatic, malarial, marsh, malignant, chill-fever, ague, fever and ague, dumb ague, and lastly, *the* Fever. So great a variety of names suggests two facts: first, diversity of type; second, wide geographical range of prevalence. I shall use the epithet autumnal, as involving no etiological or pathological hypothesis; and at the same time, including every modification; but, in speaking of diversities, other terms will find their appropriate places.

II. VARIETY AND IDENTITY.—The varieties of autumnal fever are numerous, and often seem widely separated. Thus, the difference in phenomena between a simple tertian and an inflammatory or a malignant remittent, is greater than the difference between measles and scarlatina; in some years nearly all the cases that occur are intermittent, in others remittent; finally,

although the former seem to be but mild grades of the latter, they often prove suddenly fatal; and, that too, without assuming a remittent type. Nevertheless, all the varieties must be regarded as making but a single species; as appears from the following facts: *First.* They prevail at the same times and in the same places. *Second.* Under much variety of aspect, they possess many deep-seated analogies and identities. *Third.* They frequently change from one type to the other. Thus an intermittent turns into a remittent, and the latter, assuming the type of the former, is often seen to become, first, a quotidian, then a tertian, and finally, a quartan. A simple intermittent may, in the third or fourth paroxysm, take on the character of a fatal congestive; and that which begins with an aspect of malignity, sometimes emerges into simplicity and mildness. *Fourth.* Vernal agues attack those who in autumn had suffered under remittent fever, not less than those who had experienced the intermittent form. *Fifth.* The *sequelæ* of all the varieties are almost identical. *Sixth.* The same treatment with certain modifications, is applicable to the whole. Thus they are manifestly the offspring of the same specific, remote cause; and when no particular variety is in view, may be designated by one epithet.

SECTION II.

GEOGRAPHICAL LIMITS.

BEING an endemic of all hot climates we need not look to the shores of the Gulf of Mexico for a southern limit to our autumnal fever. Its base is, in fact, within the tropics; and prevailing, of course, in Havana and Vera Cruz, it is found wherever there are inhabitants, on the northern coasts of the Gulf, between those two cities. In ascending all the rivers which discharge their waters into the northern arc of that closed sea, from Cape Florida round to the Panuco River, it is still met with; and, sometimes, as we shall hereafter see, from the influence of local causes, displays greater prevalence and malignity, than it shows further south and on a lower level.

In every other direction than the south, this endemic has its geographical limits. To the east, its barrier is the Appalachian Mountains, into the very gorges of which, however, it ascends by the valleys which penetrate their flanks. But as that chain is not found south of the thirty-third degree of latitude, it has, below that parallel, no eastern limit but the Atlantic Ocean. To the southwest the Cordilleras of Mexico, and the southern Rocky Mountains, constitute its boundaries; while, in higher latitudes, it ceases on the great plains of our western desert, long before we reach those Mountains. From what can be collected out of the travels and expeditions

of Lewis and Clark, Pike, Long, Catlin, Fremont, and Gregg, not less than from fur traders and Santa Fé merchants, it is almost unknown at the distance of three hundred miles from the western boundary of the states of Missouri and Iowa, and above the latitude of 37° N. To the north it does not prevail as an epidemic beyond the forty-fourth parallel, and ceases to occur even sporadically about the forty-seventh.

The observations from which these limits are deduced have been made on the resident inhabitants included within them; on travellers into portions of country as yet unsettled; and on the soldiery of the American and British posts. From these army returns I have, with all possible care, constructed two tables, which may properly be introduced at this place. The American returns* purport to be for ten years; but this is true of a few only; and many of the others vary from each other in the number of years through which they run, whereby the conclusions deducible from them, are entitled to less confidence than if an equal number of observations, in the same years, had been made at each post. As the number of troops was never the same at two different posts, nor during two years the same, one thousand has in the returns been assumed as the mean strength of the whole; and the number of attacks of Fever, and the actual mean strength, have both been brought to that standard. The results offered in the table, then, are not what any post did afford, but what any or all would have given, had the actual strength been at all times one thousand men. At several of them, it will be perceived the number of attacks exceed the number of men, implying that some individuals experienced several, in the course of the year. The returns are quarterly, but the quarters are those of the calendar year, and therefore, do not exactly correspond with the seasons.

The observing reader will perceive, that this table affords a variety of information: such as the decrease of the Fever in the north — its relative prevalence at different posts in the same latitude—the proportionate number of intermittent and remittent cases, and the comparative prevalence of both, in different seasons.

* Forry's Statistical Report of the Sickness and Mortality of the Army of the United States; prepared under the direction of Thomas Lawson, M. D., Surgeon-General, Washington, 1840.

TABLE

SHOWING THE NUMBER OF ATTACKS OF AUTUMNAL FEVER, IN THE DIFFERENT QUARTERS OF THE YEAR, AT TWENTY-SIX MILITARY POSTS, BETWEEN THE GULF OF MEXICO AND LAKE SUPERIOR—THE MEAN STRENGTH BEING 1000. ARRANGED ACCORDING TO THEIR LATITUDES.

Twenty-six Posts.	Autumnal Fever.	Quarters of the Year.				Total of the Year.	Comp. of annual aggregates.
		First.	Second.	Third.	Fourth.		
Key West, N. Lat. 24° 33′,	Intermittent,	70	52	6	51	179	
	Remittent,	11	00	0	00	11	
	Both,	81	52	6	51	190	190
Fort Brooke, N. Lat. 27° 57′,	Intermittent,	80	190	308	182	760	
	Remittent,	13	24	28	24	89	
	Both,	93	214	336	206	849	849
Fort King, N. Lat. 29° 12′,	Intermittent,	120	200	460	414	1194	
	Remittent,	6	41	90	56	193	
	Both,	126	241	550	470	1387	1387
Fort Jackson, N. Lat. 29° 29′,	Intermittent,	82	148	816	367	1413	
	Remittent,	4	9	128	46	187	
	Both,	86	157	944	413	1600	1600
New Orleans Barracks, N. Lat. 29° 57′,	Intermittent,	100	60	50	84	294	
	Remittent,	10	60	80	100	250	
	Both,	110	120	130	184	544	544
Fort Wood, N. Lat. 30° 5′,	Intermittent,	170	137	339	125	771	
	Remittent,	3	55	218	16	292	
	Both,	173	192	557	140	1063	1063
Fort Pike, N. Lat. 30° 10′,	Intermittent,	28	56	40	31	155	
	Remittent,	4	23	28	22	77	
	Both,	32	79	68	53	232	232
Baton Rouge, N. Lat. 30° 36′,	Intermittent,	71	124	220	107	522	
	Remittent,	40	62	100	100	302	
	Both,	111	186	320	207	824	824
Fort Jesup, N. Lat. 31° 30′,	Intermittent,	26	46	123	44	239	
	Remittent,	6	12	33	12	63	
	Both,	32	58	156	56	302	302
Fort Mitchell, N. Lat. 32° 19′,	Intermittent,	30	20	60	33	143	
	Remittent,	4	18	43	17	82	
	Both,	34	38	103	50	225	225
Fort Towson, N. Lat. 33° 51′,	Intermittent,	242	107	450	269	1068	
	Remittent,	16	37	114	30	197	
	Both,	258	144	564	299	1265	1265
Fort Smith, N. Lat. 35° 22′,	Intermittent,	190	150	445	249	1034	
	Remittent,	0	5	98	24	127	
	Both,	190	155	543	278	1161	1161

Twenty-six Posts.	Autumnal Fever.	Quarters of the Year.				Total of the Year.	Comp. of annual aggregates.
		First.	Second.	Third.	Fourth.		
Fort Gibson, N. Lat. 35° 57′,	Intermittent,	151	211	491	340	1193	
	Remittent,	12	19	161	50	242	
	Both,	163	230	652	390	1435	1435
Jefferson Barracks, N. Lat. 38° 28′,	Intermittent,	32	63	152	75	322	
	Remittent,	16	17	76	44	153	
	Both,	48	80	228	119	475	475
Fort Leavenworth, N. Lat. 39° 20′,	Intermittent,	100	151	205	143	599	
	Remittent,	1	3	16	10	30	
	Both,	101	154	221	153	629	629
Fort Armstrong, N. Lat. 41° 28′,	Intermittent,	9	70	72	30	181	
	Remittent,	6	30	73	17	126	
	Both,	15	100	145	47	307	307
Fort Dearborn, N. Lat. 41° 51′,	Intermittent,	7	65	102	66	240	
	Remittent,	3	2	4	2	11	
	Both,	10	67	106	68	251	251
Fort Gratiot, N. Lat. 43°,	Intermittent,	46	286	333	110	775	
	Remittent,	1	10	16	1	28	
	Both,	47	296	349	111	803	803
Fort Crawford, N. Lat. 43° 3′,	Intermittent,	13	40	140	67	260	
	Remittent,		2	32	7	41	
	Both,	13	42	172	74	301	301
Fort Niagara, N. Lat. 43° 15′,	Intermittent,	22	117	52	57	248	
	Remittent,	18	20	62	20	120	
	Both,	40	137	114	77	368	368
Fort Winnebago, N. Lat. 43° 31′,	Intermittent,	3	5	18	13	49	
	Remittent,	4	10	3	7	14	
	Both,	7	15	21	20	63	63
Madison Barracks, N. Lat. 43° 50′,	Intermittent,	24	98	70	35	227	
	Remittent,	0	0	20	8	28	
	Both,	24	98	90	43	255	255
Fort Howard, N. Lat. 44° 40′,	Intermittent,	2	11	28	10	51	
	Remittent,	2	6	22	3	33	
	Both,	4	17	50	13	84	84
Fort Snelling, N. Lat. 44° 53′,	Intermittent,	2	9	23	11	45	
	Remittent,	0	3	11	3	17	
	Both,	2	12	34	14	62	62
Fort Mackinack, N. Lat. 45° 51′,	Intermittent,	7	37	16	16	76	
	Remittent,	1	4	4	4	13	
	Both,	8	41	20	20	89	89
Fort Brady, N. Lat. 46° 39′,	Intermittent,	0	16	20	5	41	
	Remittent,	1	0	2	0	3	
	Both,	1	16	22	5	44	44

The British returns* are more limited, for the number of posts are smaller, and the range of country and climates less. They do not, moreover, give the relative number of cases in different seasons, or at the separate stations, and therefore express the prevalence of autumnal fever in Canada, generally, not in particular localities.

TABLE

EXHIBITING THE ANNUAL PREVALENCE OF AUTUMNAL FEVER AMONG THE BRITISH TROOPS IN CANADA.

Ratio of cases to the mean strength of 1,000.

LOCALITIES.	Intermittent Fever.	Remittent Fever.	Annual aggregate of both.
Canada, between the latitude of 42° and 47°, from 1817 to 1836, inclusive—20 years, - - -	79	5	84
Upper Canada, the principal Posts—Kingston, East end of Lake Ontario, N. Lat. 44° 8′—Toronto, North side of same Lake, in 44° 33′—Fort George, mouth of Niagara River, in 43° 15′—Amherstberg (Malden), West end of Lake Erie, in 42° 10′—from 1818 to 1827, inclusive, - -	178	12	190
Lower Canada, principal ports on the River Richelieu, which connects Lake Champlain with the St. Lawrence, latitude from 45° to 46°—Montreal, latitude 45° 31′, and Quebec, latitude 46° 47′, - - - - - - - - - - - - - - -	26	1	27

This table, by embracing the Peninsula north of Lakes Erie and Ontario, together with the banks of the St. Lawrence, down to its estuary, completes what the other left unfinished; and enables us to estimate the relative prevalence of autumnal fever, through every parallel of latitude, from the mouth of the Mississippi, to that of the St. Lawrence, and from Cape Florida to Gros Cap, at the entrance of Lake Superior.

We should be aware, however, that the numbers in the tables do not always express, correctly, the cases of fever originating in the localities with which they stand in connexion. Thus, Maj. Tulloch, the compiler of the British Report, informs us that many of the cases of fever returned from the posts of Lower Canada, were relapses in patients from the posts of Upper Canada; and in the United States, our troops are often sent to more northern posts to recover from the fevers of the south; and thus by relapsing, add not a little to the number of cases at posts which otherwise might have presented but few.

* Tulloch's Statistical Reports on the Sickness, Mortality, and Invalidising among the troops in the United Kingdom, Mediterranean, and British America: prepared from the Records of the Army, Medical Departments, and War-Office Returns, by command of Her Majesty, London, 1839.

SECTION III.

CONDITIONS WHICH IMPOSE GEOGRAPHICAL LIMITS, AND GIVE UNEQUAL PREVALENCE TO AUTUMNAL FEVER.

I. Soil.—Under this term I include all that composes the surface of the earth, apart from its waters. The loose upper stratum of our Valley consists, as far as its mineral elements are concerned, of the *débris* of the rocks beneath, or of deposits of the *débris* of other rocks, spread over the surface by ancient inundations. There are tracts of country, however, in which the rocks themselves appear at the surface. None of these conditions favor the production of autumnal fever; but on the contrary, it prevails least where they are most perfectly developed; and hence there is no reason for referring the disease to emanations from a purely mineral surface.

The soil, however, may have another element than the mineral—dead organic matter, both animal and vegetable; and this is its general character throughout the Valley. The amount of this element is very different in different places, for its production depends, *first*, on the fertility of the surface; *second*, on temperature; and *third*, on moisture. Where these conditions are all present, the growth of organic matter is redundant; where any one or more of them is wanting, it will be correspondingly limited. Thus it is small in quantity in the pine woods of the south (if we except the trees themselves), from the sandiness of the surface; in the desert beyond the Mississippi, from the same cause, and also from the want of moisture; in the far north from the want of heat, yet it is abundant even beyond the limits to which the Fever extends; on the Appalachian Mountains, from that deficiency in part, and from their rocky surface. Dead organic matter is, also, unequally distributed; for the rains wash it down from the hills, and deposit it in the valleys; where, adding to their fertility, it rapidly augments itself by promoting more luxuriant crops of vegetation.

Now, it is a safe generalization to affirm that, all other circumstances being equal, autumnal fever prevails most where the amount of organic matter is the greatest, and least where it is least. A diligent study of the topographical descriptions of *Book I. Vol. I.* will sustain this conclusion and demonstrate that decaying organic matter is *one* of the conditions necessary to the production of autumnal fever. As to the mode in which it co-operates, two opinions may be entertained: *First*, It may supply the material out of which a poisonous gas is formed; and, *Second*, It may be a nidus or hot-bed of animalcules or vegetable germs. In either case, we may presume that all kinds of decomposing organic matter, are not equally favorable to the production of the cause of this fever; but, although I have sought for facts bearing on this question, a sufficient number has not been found to justify

their presentation here. I hope the subject may attract the attention of others.

The first breaking up of the soil appears, from a variety of observation, scattered through our topographical descriptions, to be frequently followed by autumnal fever; and on the other hand, long-continued cultivation is accompanied by diminution of that disease; the element which contributes to its production becoming exhausted.

II. Living Vegetation.—Forests have been thought to modify the conditions which generate autumnal fever. Our medical topography supplies several facts, which go to show, that those who first penetrate our woods, and establish themselves in cabins, closely surrounded by trees, remain comparatively exempt from autumnal fever, till the clearing is extended. On the other hand, it is a disease of the country, and especially of newly-settled parts, where the amount of forest is so great, as to maintain a high degree of humidity. Our cities and larger towns, it is well known, seldom suffer, and they are to be considered, as in some degree, presenting the very opposite condition from our woodlands. Again, trees have been thought to arrest the spread of that gaseous agent, whatever it may be, which is said to be the true cause of the Fever; but in what manner they do it, no one can tell. It has been conjectured, that their leaves absorb the noxious exhalation; and also that they mechanically arrest the dissemination of the aerial poison. In harmony with the former hypothesis, is that of Dr. Cartwright (*see Vol. I. p.* 79), in reference to the *Jussieua grandiflora*, and some other aquatic plants, in the delta of the Mississippi; which, he supposes, absorb the agent that produces autumnal fever. I have already expressed the opinion, that the facts do not establish that hypothesis; and must here in conclusion, remark, that living vegetation is so mixed up with other conditions, necessary to the production of the Fever, that, in the existing stage of observation, its effects cannot be correctly estimated.

III. Surface Water.—In the maritime parts of Florida, Alabama, Mississippi, Louisiana, and Texas, surface water is abundant, for one side of each rests on the Gulf, which has many inlets and little bays, the banks of which are inhabited. The rivers, moreover, are numerous, and as they approach the Gulf, expand into broad estuaries or deltas. The delta of the Mississippi abounds in lakes, lagoons, and bayous. As we ascend this, and the smaller rivers, wide cypress and liquidambar swamps, annually replenished, skirt both sides. The intervening plains are cut up by smaller streams, which have wide alluvions, often subjected to inundations; and the country between them abounds in swamps; from which even the sandy pine plateaus are not entirely free. This continues to be their condition, till we reach the flanks of the Cumberland Mountains, on the east, and those of the Ozark Hills to the west. As we ascend the Mississippi, to the mouth of the Missouri, we find its annual floods leaving small lakes, ponds, swamps, and lagoons; which in the aggregate are of great extent, and but partially

drained or dried up, before the next inundation. Now, as we have seen, the whole of this region is infested with autumnal fever, beyond any other portion of the Valley.

In North Alabama, Tennessee, and Kentucky, swamps are almost unknown, except along the few rivers, which have wide bottom-lands, most of which, moreover, are exempt from inundation. The rivers, however, are sinuous, and in summer, sluggish and pondy; and it is in their vicinity, chiefly, that autumnal fever prevails. In the states of Illinois, Indiana, and Ohio, the rivers generally flow through wide valleys, many of which are liable to be overflowed. Small lakes, ponds, and swamps, are also frequent, in certain portions of those states; and it is precisely these localities, which are most infested. To the east of all the states mentioned, as we climb the mountains, the surface water is no longer found in basins; and the streams, generally, have a rapid current, down narrow and rocky channels; and here, autumnal fever nearly disappears; or, when present, is confined to the valley of some stagnating stream. Everywhere, west of the states of Arkansas, Missouri, and Iowa, surface water is scarce; the declivity of the plain which stretches from the Rocky Mountains, favoring its escape; while the subjacent sand almost absorbs even considerable rivers. Thus, as we advance into that desert, we come at the same time to the limits of surface water, and of autumnal fever. In the north there is no deficiency, for the whole country is essentially lacustrine; and up to a certain latitude, the Fever prevails. Thus the shores of Lake Ontario and Lake Erie, with those of the southern extremity of Huron and Michigan, are infested, and suffer far more than the drier lands which surround them. But beyond these limits, on the shores of the two latter lakes, and on those of Lake Superior, the Fever, as we have seen, is never epidemic, although water is abundant; and still further north, where small lakes, and their connecting streams, exist in countless numbers, the disease is unknown; showing that, while water is essential to the production of this Fever, other causes must co-operate to give it power.

Let us inquire into the *modus operandi* of this agent in the production of the disease under consideration.

1. Under the influence of solar heat it impregnates the air with vapor, giving a high dew point; and other circumstances being equal, the evaporation is greatest where the heat is highest. This, of course, is in the southern part of the Valley, and there, as we have seen, the Fever prevails most.

2. Surface water not only contributes largely to the production of a luxuriant vegetation, destined annually to perish, but is indispensable to the decomposition of what it has aided in producing. Hence, without its agency, none of the deleterious gases, which are supposed to be thus generated, could have an existence. But its presence in any or all quantities, will not answer equally well. If there be too little, the molecular movements of

fermentation are arrested for want of a solvent—if too much, the atmosphere, indispensable to the process, is excluded; or the evolved gases are absorbed and retained.

3. Its presence is essential to those chemical actions, in certain soils, which are believed, by some writers, to generate exhalations that occasion the Fever.

4. It is equally indispensable to the production of both animalcules and microscopic plants.

5. Both evaporation and condensation are known to be accompanied by electrical perturbations.

Thus water is a necessary element, in all the hypotheses which have been framed to account for autumnal fever.

But a contrary and salubrious influence has been ascribed to water; for it is held by many that this fluid absorbs the noxious gas or gases, which they believe to produce the Fever, and thus limits its prevalence. According to this opinion, the deep water in the centre of a basin, may imbibe and retain the noxious gases, which the shallow waters of its margins have contributed to generate; and, in support of the hypothesis, it has been affirmed that the vicinity of cataracts and rapids is more unhealthy than the banks of the rivers in which they occur. The absorbed gases are supposed to be there liberated by the agitation of the water. The medical topography of *Book I. Vol. I.* presents several facts bearing on this hypothesis. Thus Wetumpka, at the foot of the long rapids of the Coosa River; Louisville, at the falls of the Ohio River; and Maumee City, at the termination of the rapids of the Maumee River, are all infested with autumnal fever; but other towns, on the same rivers, are likewise scourged with that disease; and Oswego River, which drains the Montezuma swamps of Western New York, has at its mouth a great number of mills, yet the inhabitants suffer but little from that disease. It prevails still less at the Falls of Niagara; and finally, at Zanesville, where a natural waterfall has been augmented by artificial means, and on the Kentucky River, where there are series of pools and dams, there is no special prevalence of the Fever. Thus the facts furnished by our Valley, do not prove that waterfalls eliminate a gas which is the cause of the disease under consideration.

IV. TEMPERATURE.—The fact that autumnal fever prevails perpetually and virulently, within the tropics, but ceases long before we reach the polar circle, demonstrates that a high temperature is one of the conditions necessary to its production. Should it be ascribed to heat alone? The answer must be in the negative; for places having the same temperature, but varying in other conditions, are very differently affected with autumnal fever. Thus the people of Mobile Bay suffer greatly, while those who live on the adjoining oak and pine terrace escape; and the summer heat of the southern portions of the great desert is intense, but those who traverse it, and keep at a distance from its water-courses, pass the season unaffected. It cannot

be affirmed, that the direct action of a hot atmosphere on the body, does *not* contribute to the production of the Fever; for, on the contrary, where it prevails as an epidemic, exposure to the noon-day summer sun is often followed by an attack; but such exposure, in a different locality, will not produce it; and, therefore, we may conclude that in its direct action, heat is merely an exciting cause, on which it is not necessary to expatiate in this place; and I will therefore proceed to trace out all its indirect effects.

Our army statistics furnish some instructive facts on this point. The posts which lie along the Mississippi, are placed nearly under the same conditions, in everything but temperature, which varies according to their latitude. They are, therefore, well fitted to indicate the influence of this climatic condition in the production of the Fever. Its relative prevalence at these posts, which extend through more than thirteen degrees of latitude, is presented in connexion with the annual and quarterly mean heat, in the first part of the following table, while the second offers a comparison of two posts in the region west of the Mississippi, and the third of two on the Lakes.

TABLE.

	Posts.	North Lat.	Annual No. of cases, in 1000 mean strength.	Annual mean temperature.	Mean heat of Winter.	Mean heat of Spring.	Mean heat of Summer.	Mean heat of Autumn.
		° ′		°	°	°	°	°
Along the Mississippi River.	Baton Rouge,	30 36	824	67.56	52.68	68.72	81.48	67.38
	Jefferson Barracks,	38 28	475	56.93	38.98	56.55	76.19	54.38
	Fort Armstrong,	41 32	307	50.65	25.15	50.82	74.57	52.07
	Fort Crawford,	43 03	301	47.35	20.69	48.25	72.38	48.09
	Fort Snelling,	44 53	62	45.15	17.29	46.56	71.16	45.59
W. of Miss. River.	Fort Gibson,	35 48	1435	61.07	42.50	61.26	79.17	61.53
	Fort Leavenworth,	39 23	629	52.34	27.60	53 38	74.00	54.39
On the Lakes.	Fort Dearborn,	41 50	251	46.14	24.31	45.39	67.80	47.09
	Fort Brady,	46 80	44	40.62	18.06	38.17	62.14	44.13

To show, by a comparison of localities, the exact relation between temperature and autumnal fever, the conditions of the different places should, in all other respects, be alike, which is not often the case: nevertheless, the medical topography and hydrography of the posts, compared together in the foregoing table, will be found substantially the same, and they show, that with the decrease of yearly and summer heat, other conditions continuing unchanged, there is an abatement of the Fever. It is, however, with the heat of summer, and not that of the year, that autumnal fever is connected; and the question here arises, what summer temperature is necessary to the production of the Fever? This question cannot be rigorously answered; for the number of observations hitherto made, in the proper region, is too small to justify a positive conclusion; we may, however, assume, that a summer temperature of sixty degrees, is necessary to the production of the

Fever; and that it will not prevail as an epidemic, where the temperature of that season falls below sixty-five; finally, that if the other conditions favoring its production are deficient, it will cease before those reductions of temperature have been reached.

According to these conclusions, the Fever will occur in winter, at all places where that season has a mean temperature of sixty degrees or upward; as at Vera Cruz, Tampico, Havana, Key West, Tampa Bay, and Fort King, as may be seen in the table (*Vol. I. p.* 487); and it is well known that cases do occur at those places, in that season; but at the two latter posts, where the winter heat barely rises over sixty, they are few in number. At New Orleans and generally under the thirtieth parallel, where the mean winter heat is as low as fifty, the Fever is suspended. But the seasons are made up of months, and we are here brought to consider its connexion with their respective temperatures.

Up to Tampa Bay, every winter month rises above sixty degrees; but at New Orleans, or the thirtieth parallel, only the nine months from March to November, have that temperature; and as we advance to the north, the number of months having it constantly decreases. Thus, at St. Louis, it is attained by five months only—from May to September, inclusive; at Fort Snelling, by four; at Fort Brady, by three; at Montreal, by four; at Quebec, by three. In advancing further north, June and September fall below it; and, finally, in the distant north, July and August, or the entire year. Long before this reduction is reached by those two months, however, the Fever ceases; and therefore it results, that a continuance for more than two months of a heat equal to sixty degrees, is necessary to the development of the Fever. Hence we can understand, why it prevails more in October than April, although their mean temperatures are nearly the same; in November than June, notwithstanding the latter is much the warmer month, and in September and August, than July—the hottest month of the year. The greatest prevalence in every latitude, is indeed, generally some weeks, after the hottest month; showing that the effects of temperature are cumulative. It appears from all that has been said, that within the tropics, autumnal fever may occur throughout the year; and that as we move northerly, the duration of its prevalence shortens, by its beginning later in spring, and terminating earlier in autumn. March and November first escape; then April and May on the one hand, and October on the other—lastly, June and September.

In contemplating the climatic relations which exist between autumnal fever, and certain aspects of vegetation, we find that in the tropical regions they are the same throughout the year, and that when we attain the thirty-third parallel, which constitutes the northern limit of several southern trees and plants, the prevalence of the Fever is for a much shorter period; that its disappearance is nearly at the same curve, at which the miscellaneous vegetation of the middle latitudes, gives place to the terebinthinate trees and

birches, of the north; finally, that maize or Indian corn, which grows all the year round, in the tropical regions, finds the summers too short for the ripening of its grain, in nearly the same curve of summer temperature, at which autumnal fever is arrested.

If change of latitude, by diminishing the heat of the atmosphere and that of the earth's surface can, as we have just seen, arrest the production of autumnal fever, an increase of elevation above the level of the sea, may likewise do it. Thus the Fever which scourges the *tierra caliente* of Mexico, near the level of the sea, is almost unknown in and around the city of Mexico, at an elevation of seven thousand four hundred and fifty feet, although the latitude remains the same. The inhabitants among the sources of the Kenawha and Tennessee Rivers, on the Appalachian Mountains, at a medium elevation of nearly three thousand feet, are almost exempt, while those who occupy the valleys, under the same parallels, are affected; and, further north, at half that elevation, where the Alleghany and Genesee Rivers have their sources, the disease is almost unknown, while on the shores of Lake Ontario, directly north, it prevails. In traversing that mountain terrace, which has a mean summer temperature of sixty-three degrees, I witnessed a frost, on the night of the second of August, which destroyed the Indian corn; but, on descending into the valley of the Genesee, which, although a degree further north, is infested with the Fever, the fields of maize were uninjured. Finally, the constantly increasing elevation of the desert to the west of the Mississippi is, no doubt, one cause of the disappearance of the Fever under the same parallels, in which it prevails on the banks of that river.

Having established the paramount influence of high temperature in the production of autumnal fever, it remains to inquire into the modes in which it may operate. I have already referred to its effect as an exciting cause, but this view is too limited, and others must now come under consideration.

1. The long-continued impress of summer heat upon the surface of the body, occasioning copious perspiration, and through the nerves of the skin sympathetically affecting the internal organs, more especially the abdominal, may predispose to this form of fever; and the cool nights of early autumn, acting on the same surface, may still further derange the economy. That such nights, and occasional sudden changes of temperature, are often followed by an immediate development of the Fever, is well known.

2. Heat promotes great evaporation from all moist and watery surfaces, thus giving to the atmosphere a high dew point.

3. It favors the fermentative decomposition of organic matter, and the production of new compounds.

4. It facilitates the multiplication of minute but visible animals, and cryptogamic plants, and may be presumed, therefore, to multiply the microscopic—both animal and vegetable.

5. It evaporates the superfluous water of ponds, swamps, marshes, and

lagging streams; thus bringing them into a condition favorable to the more rapid decay of the organic matters which they contain or cover over, and thereby promoting the extrication of gases.

6. It dries the surface of the ground after the rains of spring and summer; and may (as has been asserted) cause it, in the act of desiccation, to send forth deleterious exhalations, different from those generated in deposits of decomposing organic matter.

7. It disturbs the equilibrium of the electricity of the atmosphere; hence summer thunderstorms are of almost daily occurrence, on the coasts of the Gulf of Mexico; but on the shores of Lake Superior they are rare.

Thus solar heat plays an indispensable part in every hypothesis which has been proposed to explain the origin of autumnal fever; answering equally well for the advocates of combined heat and moisture—miasmatic exhalations, microscopic beings, and atmospheric electricity.

We have now reviewed all the obvious conditions which seem to concur in the production of our autumnal fever, and endeavored to assign the *modus operandi* and influence of each. We have seen the necessity of their concurrence, from the fact that the absence of any one puts an end to the prevalence of the Fever. These conditions are dead organic matter, resting on or blended with the mineral elements of the soil; water, not in any, but a certain quantity; and temperature, above the sixtieth degree, continuing for at least two months. And here we might stop, but for the instinctive propensity of the human mind to arrive at the knowledge of a single efficient cause; to which, therefore, a chapter must be devoted.

CHAPTER II.

SPECULATIONS ON THE EFFICIENT CAUSE OF AUTUMNAL FEVER.

SECTION I.

METEORIC HYPOTHESIS.

It has been suggested, and, indeed, is believed by some physicians, that while the three conditions recognised in the last chapter, are present wherever autumnal fever prevails, but two of them—heat and moisture—exert an influence in its production. Under the joint influence of these elements, vegetation will of course flourish and decay; but not contribute to the production of the Fever. The advocates of this opinion, of course, deny the existence of a special poison; and ascribe the disease to the direct, combined action of a hot, humid, and electrical atmosphere. The discussion

and drift, the dam was torn down, and the perpendicular face of the deposit exposed to the action of the sun and air, in the month of August. The consequence of this was, that nearly all the men who performed this labor, were seized with severe autumnal fever, and one of them died. There was no pond above, nor any marsh in the neighborhood; and the people generally were healthy at the time. Here there was no combined agency of heat and moisture; and hence the facts afford strong evidence of a developed aerial poison.

9. On Paint Creek, Ohio, a mill-pond was generally drained the first of June, and the rains of that month washed away the silt and dead plants and animals; so that the people of the adjoining village of Washington suffered but little from the Fever; the draining was postponed till July, and no rains followed to wash out the basin. Then there immediately followed an epidemic autumnal fever, which prevailed most on the side of the village next the pond. More than a fourth of the population suffered an attack, and nearly three per cent. of the whole number of inhabitants perished.*

10. It has frequently happened, that individuals who have lodged for a single night in certain localities, have after several days, or even weeks, been taken down by the Fever.† More than this, persons, living in places where it never originates, have been seized in the spring with intermittents, after having in the preceding autumn, travelled where the Fever prevailed. Now it is in no degree characteristic of heat and moisture, to produce *remote* effects. A catarrh, a pleurisy, or a rheumatism, comes on soon after exposure, or not at all. The development of the disease, at a distant time from that at which the remote cause was applied, clearly suggests, that the cause was something else than a particular condition of the sensible properties of the atmosphere.

11. At our different salt works, the operatives spend their lives in a hot atmosphere saturated with vapor; and yet, on the whole, are more exempt from fever than the surrounding population.‡

12. Lastly, in some of our manufacturing establishments, the indoor artisans and operatives, labor in a heated atmosphere supersaturated with vapor, but remain free from autumnal fever.

These facts seem to me conclusive in their bearing against the meteoric hypothesis; except so far as certain atmospheric conditions may act as exciting causes; and we are, therefore, thrown upon the alternative,—a deleterious agent, diffused in the atmosphere; the positive existence of which seems to me to be established, by the facts which have been cited.

Now this agent may be either one, of two kinds—inorganic or organic—and both have a *prima facie* advantage over the hypothesis we have examined, in demanding the concurrence of all the conditions—heat, water, and dead vegetable and animal forms—which have been shown to be always present, wherever autumnal fever prevails; while the last is left out of ac-

* See Vol. I. p. 294. † See Vol. I. p. 370. ‡ See Vol. I. pp. 264 and 404.

suffer decomposition when they disappear from the surface, it may be well to say something more on this subject.

The soil of which the analyses are given at *pages* 75, 76, and 293 (*Vol. I.*), all contain organic matters, which, in one, more than equal all the inorganic substances. One of the specimens examined was silt, taken from a point ten feet below the surface, in New Orleans; and Professor Riddel found that nearly one-fourth consisted of "organized matters, such as the sporules or germs of algæ, animalcules, and their ova;" and at the depth of sixteen feet, in sinking the gas tanks of that city (*Vol. I. p.* 76), wood was found which had the texture of cheese, when the spade passed through it. The length of time required for the Mississippi to deposit the sixteen feet of superincumbent silt, must have been indefinitely long. Again: in parts of Ohio, where there is a deep diluvial or post-diluvial deposit, when wells are dug, plants unknown in the neighborhood often appear upon the earth which had been thrown out, and doubtless spring from seed, which had lain buried for an immense length of time. Still further: where the upper crust is composed of sand, but produces the kinds of vegetation that can grow on such a surface, the decaying organic matter is washed into the ground by rains. Thus it is that the manure or mould, that is spread on the white sands of the gardens of the navy yards at Pensacola Bay, rapidly disappears. In this way, a spot which seems destitute of dead organic matter, may have an admixture of that element below the surface. From these facts, we are warranted in reaffirming, that the soil and subsoil, of all parts of the Interior Valley, contain organic matter, in every stage of decomposition.

II. We come now to consider the dead and decaying organic matter deposited on the surface. This does not consist of vegetable forms merely as we too often suppose, but likewise of animal. An inspection with the naked eye, and still more with the microscope, reveals to us that innumerable insects, and other minute animals, live and perish among vegetables. Many tribes, moreover, find their sustenance and abode in the decaying remains of plants. Still further, the surface and superficial parts of the ground teem with small quadrupeds, reptiles, and worms; while the trunk of every fallen tree, in a certain stage of its decay, abounds in various kinds of grubs or larvæ. From the mouldering remains of trees and other vegetables, moreover, spring mushrooms, algæ, lichens, and other cryptogamic plants, which abound in nitrogen beyond the higher order of vegetables, and have, in fact, nearly the same chemical elements with animals. Finally, wherever there are pools, or swamps, or running streams, there are fishes, molluscæ, and crustaceæ, which multiply and perish, and whose bodies then float and dissolve, or sink to the bottom, or are thrown upon the shores, and mingled with the remains of land animals and plants. Thus, a vegeto-animal layer overspreads the surface of the country: and under the combined influence of water, heat, and air, when the two former are in the right

proportions, is constantly undergoing decomposition, and originating new chemical compounds.

III. But the organic covering of the surface is, by no means, of the same nature in every locality. We cannot tell what kind of plants and animals, in past ages, left their remains on what now makes our subsoil; but the existing forms are subjects of observation, and, in the investigation which occupies us, should not be entirely overlooked.

1. The trees, in what are called the pine woods of the South, are chiefly resinous, and abound in hydrogen. Vegetable matters having such a composition are little disposed to pass into fermentation, but are decomposed by the slow combustion of several of their principles, by the oxygen of the atmosphere; and if the efficient cause of autumnal fever be a gas, formed during the fermentative decomposition of organic matter, we have here one explanation of the comparative absence of that fever in those woods.

2. The *Gramineæ*, *Equisetacea*, and indeed, all kinds of grasses, contain in their culms and blades a great quantity of silicate of potash, and in their seed much phosphate of magnesia and lime. They undergo decomposition very slowly, and the results cannot be the same as those of plants widely differing from them in composition. In describing the medical topography of the Balize (*Vol. I. p.* 90), the extensive and luxuriant growths of the *Phragmites communis*, *Typha latifolia*, and *Scirpus lacustris* were mentioned; and I have already conjectured that their falling, when dead, into brackish water, may modify their mode of decomposition; but we may also believe that their composition exerts an influence; and that, on the hypothesis that the Fever is the offspring of the decomposition of organic matter, one cause of its milder prevalence, at the final termination of the Mississippi, than along the same river above, may be the peculiar composition of its reigning vegetation. Again: the vegetation on the grand prairies, beyond the Mississippi, is chiefly gramineous, and to this, on the same hypothesis, we might, perhaps, consistently attribute some portion of their exemption from the Fever.

3. The oak tree abounds in tanno-gallic acid, and is often the governing tree in considerable tracts of forest; which, I think, are less infested with the Fever than localities having a diversified, arboreous vegetation. At all events the *exuviæ* of such a forest might be expected to afford the elements for gaseous exhalations of a different sort from those of pine, or of trees not abounding in that acid.

4. The *Leguminosæ*, including all kinds of pulse, as peas, beans, and lentils, contain very little potash, silica, or the earthy phosphates, while they abound in nitrogen, and must, therefore, while under decomposition, yield gases of a very different kind from the *Gramineæ*.

5. The extensive natural family of plants called the *Crucifera*, embracing the radish, mustard, turnip, and cabbage, contain sulphur and nitrogenized ingredients, fitting them to give out, in decomposition, gases varying from the last.

6. Not to pursue the subject any further, the *fungi*, *boleti*, and other cryptogamic plants, which abound in dark and shaded woods have, as already indicated, a composition almost animal, and cannot, in their spontaneous decay, afford results of the same kind with plants of a widely different composition.*

IV. The facts which have been cited teach us that there is, mingled with the soil or resting upon it, a great amount and endless variety of organic matter, both animal and vegetable, to the decomposition of which, and to the resulting new compounds, the malarialists look for the efficient cause of autumnal fever. In doing this, a special stress may, with great propriety, be laid on a few unquestionable facts.

1. That, all other circumstances being equal, the Fever prevails most where the organic matter is most abundant, in or resting on the soil.

2. That where the surface is not moist enough to favor the decomposition of organic matter, the Fever has but little prevalence.

3. That a temperature of sixty degrees of Fahrenheit, or above, is necessary to fermentation and putrefaction, and that the Fever ceases, in going north, when we reach a summer temperature below that degree.

4. That particular localities have experienced the Fever, in an epidemic form, when a surface abounding in organic matter has been newly exposed to the action of the summer sun.

5. That under long cultivation, which exhausts the organic matter of the soil, and prevents its accumulation on the surface, the Fever almost ceases to appear.

V. These facts undeniably establish a connexion between a certain condition of the surface and autumnal fever; but they do not prove the existence of malaria, or a *gas*, which is the efficient cause of the Fever, and to this point we must now give attention.

1. The observed aeriform products of this decomposition are carbonic acid, carbonic oxide, carburetted hydrogen, sulphuretted hydrogen, and carbonate of ammonia. Now, there is not a single fact going to show that either of these gases can produce autumnal fever. On the contrary, as the result of experience, it may be safely affirmed, that they do not; for the effects which follow an exposure to them are of a different kind. But it can be said that, in the endless variety of new compounds, which nature may form out of the ultimate elements of plants and animals, there may be many which have not yet been detected, and that some one of these is the efficient cause of the Fever, and this cannot be denied. But we must not forget that it is an assertion without proof — a mere suggested hypothesis—a proposition to be proved.

2. It is well known to us all, that there are sickly and healthy seasons at the same place, and sometimes over large portions of our Valley, while the

* Liebig: Chem. applied to Agricul. and Phys.

amount of organic matter remains unchanged; and, as yet, it has not been shown that this can be explained by a reference to varying degrees of heat and moisture, though the subject has not received sufficient attention to show that it cannot.

3. The Fever occasionally appears in limited localities, from which it is in general entirely absent; the surface meanwhile remaining, to all observation, precisely the same.

4. All the known gases are either simple bodies, as hydrogen and chlorine, or binary compounds of two simple elements, as carbonic acid, ammonia, and carburetted hydrogen, and their principles are united in definite proportions, giving to each a uniform and peculiar character. If we may depend on analogy, the assumed undiscovered gas, called malaria, must be of the same character; and, therefore, at all times and places be productive of the same effects. Now although autumnal fever is a disease of intrinsic uniformity, it shows modifications which have not been explained by the assignment of modifying causes; and without such causes, its diversities constitute an objection to the existence of a single agent of an unchangeable character.

On the whole, therefore, I must repeat, that while the conditions under which our autumnal fever appears, are sufficiently clear to observation, the existence of a special gaseous agent, resulting from them, remains to be proved.

SECTION III.

VEGETO-ANIMALCULAR HYPOTHESIS.

I HAVE united two words to express an hypothesis which ascribes autumnal fever to living organic forms, too small to be seen with the naked eye; and which may belong either to the vegetable or animal kingdom, or partake of the characters of both.

In the year 1832, I published in the Western Medical and Physical Journal, of which I was the editor, a series of papers on Epidemic Cholera, which were afterward collected and enlarged into a small volume;* in which an attempt was made to show, that the mode in which that disease spreads, was more fully explained by the *animalcular* hypothesis than any other which had been proposed. The brief investigation then given to the subject, reinspired my respect for the opinion long before expressed, that autumnal fever, and many other forms of disease, might be of animalcular origin; and the discoveries since made by the Ehrenberg school, have seemed to render that doctrine still more probable. But I have neither had time nor means for experimental or bibliographical inquiry; and do not propose to dwell very long upon the subject in this place.

As applied to Epidemic Cholera, I regard the hypothesis of animalcules as more plausible than that of vegetable germs; but in reference to

* A Practical Treatise on the History, Prevalence, and Treatment of Epidemic Cholera. By Daniel Drake, M.D. Cincinnati: 1832. Pp. 180.

autumnal fever, either may be assumed; and in support of the assumption, I proceed to make the following observations:

1. The microscope has revealed the existence of a countless variety of organic forms, which surround and penetrate the bodies of larger animals and plants, whether living, or dead and decaying, inhabit all waters, salt and fresh, and swarm in the atmosphere; buoyed up and moving by their own organs, or sustained by their levity, and wafted about by currents of air. The difficulty of detecting them in the atmosphere is greater than in water, or when attached to solid substances; but to my own mind, it seems probable that they exist in the aerial ocean in greater multitudes than elsewhere. For, *first*, minute particles of matter, organic and inorganic, are at all times floating in that ocean, and may serve as their food or resting-places; and, *second*, as the surface of a body becomes greater in comparison with its weight, the more it is reduced in size, it follows that living, organic forms, both animal and vegetable, may be of such size, as to float permanently in the air. The power of reproduction, possessed by these microscopic creatures, is still more wonderful than their minuteness. It exceeds, indefinitely, all examples presented by the visible organic kingdom; where, however, we see the government of the same law, for, in both plants and animals, the small multiply more rapidly than the large. In contemplating the invisible living world, in which the visible is, as it were, immersed, the mind becomes bewildered, as in meditating on the infinite, and requires to fall back upon obvious facts. Now one of these facts is, that whole rock formations, of great thickness and extent, have been found, under the microscope, to be composed entirely of the silicious shells or coverings of animalcules. In such beings, the increase seems to be merely by secretion from, or division of the parent body.

2. Among visible plants and animals, there are species that form no poison, and others which secrete that, which applied to, or inserted in our bodies, produces a deleterious effect, which is generally of a definite kind. Thus, the venom of the rattlesnake produces a disease of definite form; cantharides another; certain fish are poisonous when eaten; wasps and bees instil a venom; and the smallest visible gnat, as that which inhabits the forests of the middle latitudes, and that which is known under the name of sand fly on the shores of the Gulf of Mexico, inflames the skin; while the juice of stramonium, the exhalations of the rhus toxicodendron, and the fungus which grows beneath its shade, excite peculiar diseases. It seems justifiable to ascribe, by analogy, to microscopic animals and plants, the same diversity of properties which we find in larger beings, differing from them, as we may presume, in nothing but size and complexity of organization. We may suppose, then, that while many species of this minute creation are harmless, there are others, which can exert upon our systems a pernicious influence. This, moreover, is in accordance with what we know of gases, some of which, as nitrogen, are inert, while others are deleterious.

Under this head, moreover, we must not forget the fact, that nearly all the animals and plants which secrete a poisonous fluid, grow in the southern regions, and we may, analogically, suppose that the microscopic beings in those regions are more pernicious than those of higher latitudes. Now it is in the warmer portions of our Valley, that autumnal fever has its greatest prevalence.

3. We know that water is essential to the support of those animal and vegetable forms which are matters of observation by the unassisted eye; and many conclude, therefore, that it is equally necessary for the tribes which are invisible. Indeed, it is known of many, as the *rotiferæ*, that if deprived of moisture, they seem to die, but may be revived many years afterward by the application of that fluid. Now we have seen that, in the western part of the Valley, where great aridity prevails, the Fever is almost unknown; while it prevails with greatest frequency and violence, other conditions being the same, where there is adequate humidity.

4. A high temperature is favorable to the development of animal and vegetable life. In the southern parts of the Valley, animal forms, especially of the lower order, are greatly multiplied, and vegetation is luxuriant. If this be true of the visible, why may we not conclude that it is equally true of the invisible. Now, it is precisely in those regions, that the Fever, other circumstances being equal, displays its greatest prevalence and malignity. When we look to the north, we find that, after reaching the parallel which has an isotheral curve of only sixty degrees Fahrenheit, the amount of visible organic life is much diminished, and continues rapidly to decrease; we may therefore presume, that the same is true of microscopic plants and animals. But we have already seen, that where the summer temperature falls below sixty degrees Fahrenheit autumnal fever is unknown.

5. In the visible organic world, we find animals subsisting on plants, or on other animals that have fed on vegetables. Again: the decomposing remains of one generation of plants, favors the growth of another; and thus the soil gradually acquires the ability to bring forth a more luxuriant crop. Organic matter is, then, the proper, though not sole nutriment of organized beings. Such being the law, we may presume that, *cæteris paribus*, where dead organic matter is most abundant, microscopic tribes will be most multiplied. It is a familiar fact, that such matter abounds, through almost every stage of its decomposition in visible beings, which subsist upon it. Thus flesh has the larvæ of the green and many other flies; rotten wood its grubs; vinegar, as the result of decomposition, its eels—sometimes visible to the naked eye; cheese its visible and invisible inhabitants; and bread its mould, a cryptogamic plant. Finally, all vegetable infusions, when exposed to the air have their *infusoria*. It is impossible, then, to doubt, that myriads of microscopic beings swarm around, and enter the interstices of all dead organic matter; and thus we have reason for believing, that they prevail most where such matter is most abundant: and it is in the same

localities, other circumstances being equal, that we find the greatest prevalence of the Fever.

6. By the vegeto-animalcular hypothesis, we can explain the concentrated prevalence of the Fever in certain places, as rationally as by the malarial hypothesis. Thus, its virulent reign at the head of Pensacola Bay, where there are extensive deposits of river alluvion, may be referred to the multiplication of animalcules or germs, where they find abundance of nutriment; and in the case of the exposure of the face of a deep stratum of silt by the removal of a mill-dam on Cedar Creek (*Vol. II., p.* 31), we have only to suppose, that they immediately began to multiply upon the denuded surface.

7. It has often been observed, that the Fever has suddenly increased after rain; and this might have arisen from the resuscitation of organic forms rendered torpid by previous drought.

8. It may be, that cold produces a state of suspended animation in these as in many larger animals, and in numerous plants; and that the first warm weather of spring revives and sets them to multiplying; when they generate, what are called vernal intermittents (or at least, a part of such cases); the origin of which cannot be rationally ascribed to malaria developed at that time.

9. Microscopic observation and analogy render it probable, that in the invisible, as well as the visible province of the organic kingdom, there are distinct species, which constitute, by their union, natural families or orders. We know that in each natural assemblage of the larger plants and animals, the species resemble each other in many internal qualities, as well as in their forms. Thus, an astringent principle pervades the various kinds of oak; a resinous principle the linear evergreens; an aromatic oil, the peppermint, and other didynamous herbs; a poisonous principle, the different species of rhus; and that a narcotic principle pervades a large assemblage of plants. We know, also, that these various active principles in each group, are in general analogous, but not identical; whether we examine them by their sensible properties, with chemical reagents, or observe their effects upon the living body. Now, may it not be, that two distinct species of the same natural order of microscopic beings may produce autumnal fever? May not one be the cause of intermittents—the other of remittents? may not both act on the system at the same time? and may we not thus explain diversities, which are inexplicable on the malarial hypothesis? Every practical physician knows, that while the juice of a variety of plants will produce the pathological condition called narcotism, the symptoms of that state, when induced by different agents, differ as widely from each other, as the symptoms of the different forms of autumnal fever.

10. In discussing the meteoric hypothesis, it was said, that the pathological effects of a certain condition of the principles of the atmosphere, are always immediate; and it might have been remarked, when treating of the malarial hypothesis, that as far as we know, the effects of gases are likewise

immediate; but we are certain that autumnal fever often begins many days, and even weeks or months, after an exposure to its remote cause. Now we know, as a general fact, that many animal poisons do not develop their effects, till after the lapse of a greater or less length of time. Thus, two weeks may elapse before small-pox will appear, after exposure; and two years have passed away, before hydrophobia has followed on the bite of a mad dog. On this point, then, the vegeto-animalcular hypothesis, has an advantage over both the others.

11. It has been already stated, that autumnal fever prevails very unequally in different years; and that, in the same locality, it may, in one autumn, be malignant and epidemic, and in another, mild and sporadic. This can, perhaps, be better explained on the hypothesis we are now discussing, than on either of the others; for we know, that throughout the visible organic domain, reproduction is by no means uniform. A year of great abundance, may be followed by one unproductive, in the vegetable kingdom; and in the animal, one summer and autumn will be infested by insects far beyond another. It has often happened, that musquitoes have been absent from the banks of the middle portion of the Ohio River, for a year, and in the next appeared in immense numbers. We have but to suppose insect forms of a parallel size, to live under corresponding laws, and the hypothesis now before us, offers an explanation of sickly and healthy seasons.

12. It is well known that the long-continued cultivation of the soil, and the building of towns and cities, diminishes the prevalence of the Fever. Now this cultivation implies the drying up of a great deal of surface water; the burning up of the natural vegetation, and the gradual decomposition of that which has been mingled with the soil. Summer crops, as those of wheat and hay, are also removed, and not suffered like the natural herbage to accumulate on the surface; and those of autumn are either removed, or in the course of the winter consumed, to prepare the fields for new planting. Thus the food of microscopic beings is destroyed, and their reproduction arrested.

13. We are familiar with the fact that many persons never sicken with autumnal fever, while others around them will have repeated attacks. This is ascribed to difference of susceptibility, and of exposure to exciting causes. Such ascription is no doubt correct; but the vegeto-animalcular hypothesis offers, from analogy, an additional explanation. It is well known that certain visible insects prey on some individuals much more than others—seem to be attracted by one and repelled by another—and we have but to grant to the invisible the same tastes and instincts, to understand that some persons may always draw swarms around them, while others escape their depredations.

14. People who inhabit houses built on the hills adjoining valleys are said to suffer more than those who reside below. Now every breeze may waft and lodge in such habitations the microscopic beings which multiply in the rich and humid valley-soil. It has also been observed, that a grove of forest

trees between an inhabited house, and what is called a sickly spot, gives comparative immunity from the Fever; and may not the leaves of such trees as successfully arrest animalcules, or vegetable germs, as they can absorb a gas not designed for their nourishment?

From what has been said, it appears obviously, I think, that the etiological history of autumnal fever, can be more successfully explained by the vegeto-animalcular hypothesis, than the malarial. But both, in the present state of our knowledge, must stand as *mere hypotheses*. Neither can claim the rank of a theory; nor will it be entitled to the confidence of the profession until many additional facts are brought to its support.*

IV. VALUE OF THE DISCOVERY OF THE EFFICIENT CAUSE OF AUTUMNAL FEVER.—I cannot, *a priori*, attach much practical importance to a discovery of the *efficient* cause of autumnal fever; and have devoted several pages to its discussion, from deference to my brethren, much more than from my own conviction, of the value of the discovery to which so many minds are directed. Did we know the particular meteoric condition, the gas, or the organized microscopic species which produces the Fever, we should not probably be able to defend ourselves against it, by any precautions, but those which experience has already established; nor should we be able to destroy the efficient cause without annihilating the conditions under which it is generated. Those conditions are already well known. The individual exposed to them is liable to an attack—he who keeps away remains exempt. The people of the country escape the vesicular eruption produced by the *rhus toxicodendron* or the *rhus vernix*, by keeping beyond the sphere of exhalation. They know nothing of the nature of the poisonous emanation, and yet their means of protection are as perfect, as those of the chemist would be, who might analyze the poison and give it an appropriate name. Nor is it probable that the discovery of the efficient cause would throw any light upon the treatment. It was not a knowledge of its cause that taught us the cold treatment of small-pox;—we know the cause of hydrophobia and yet cannot cure it;—we do not know the cause of goitre, but have discovered that iodine is an efficient remedy.

Ignorant, however, as we are of any definite efficient cause for autumnal fever, I am a full believer in its existence, and shall speak of it as a specific agent, known only by its effects on the living body. These effects constitute the disease we have been studying in its etiology; and are now to contemplate in its symptomatology, pathology, and therapeutics. In proceeding to do this, the first inquiry naturally is, into the manner in which the assumed agent makes its impress on the system. In doing this, I wish it understood that if I should, at any time, use the word malaria, it is merely to designate the remote cause, *whatever* it may be.

* When this article was about to be sent to the press, a friend handed me Professor Mitchell's Lectures on the "*Cryptogamous origin of Malarious and Epidemic Fevers*," which I had not before seen. The array of facts made by the learned author, seems almost irresistible; and from his distinguished reputation, it will no doubt, lead many others into new courses of observation and experiment.

CHAPTER III.

MODE OF ACTION AND FIRST EFFECTS OF THE REMOTE CAUSE OF AUTUMNAL FEVER.

SECTION I.

APPLICATION OF THE POISON.

Assuming the existence of a poison concealed in the atmosphere, we are led to inquire on what surfaces it makes its primary impression.

I. Action on the Skin.—Several known gases act with such energy on the cutaneous surface, that when they are applied, for some time, they produce decided effects.* But can this be affirmed of the cause of autumnal fever? Does it modify the vital properties, and pervert the functions of the skin; and, through sympathy, the organism generally? Does it penetrate that integument and mingle with the blood? There are facts which seem to favor an affirmative answer, to at least one of these questions. *First.* Exposure of the surface of the body to the night air, in early autumn, is often followed by an attack of the Fever. *Second.* The functions of the skin, both perspiratory and calorific, are signally impaired in the forming stages of the Fever. In opposition to the first of these facts, it is well known that a hearty meal, a debauch with wine or whiskey, the action of a hot sun, or the violent operation of a cathartic, when the Fever is epidemic, may invite an attack; and the exposure of the body at night, may like them, be only an exciting cause. In opposition to the second I may say, that the other functions of the body are impaired, as early and extensively, as those of the skin. Proof is wanting, then, that the remote cause acts upon or penetrates the skin, to the production of this fever, though the opposite cannot, in the present state of our knowledge, be established.

II. Action on the Stomach and Bowels.—The remote cause has been supposed to exert its primary influence on the gastro-intestinal mucous membrane, or to enter the circulation through that surface. The facts in support of this opinion are: *First.* The early derangement of the functions of the stomach, liver, and bowels, evinced by loss of appetite, nausea, increased or suppressed secretion of bile, and constipation, or diarrhœa. *Second.* The actual development, in many cases, of gastro-enteritis. *Third.* The alleged necessity of admitting the latter condition, as requisite to the production of the Fever.

But these facts are inconclusive, and the objections to the hypothesis many. In the *first* place, as I have said of the lesion of the functions of the skin, those of the digestive organs have no priority over lesions of other functions.

* Edwards on Physical Agents. Muller's Physiology. Christison on Poisons.

Muscular languor, impaired perspiration, diminished heat, heaviness of the head, reduced activity of the mind, and pain in the back, or several of these symptoms, are as early in their appearance as the disorders of the digestive organs—sometimes earlier; for every physician has met with cases, in the forming stage of the Fever, in which he found it necessary to prohibit the patient from eating. In the *second* place, both the symptoms and the required treatment of numerous cases, show that gastro-enteritis is not present. Indeed, splenitis is oftener present than mucous inflammation, and hepatitis is by no means uncommon; but the cause of the Fever cannot reach either of those organs without penetrating others. And if *they* can become inflamed, without being directly acted on by the poison, the existence of gastro-enteritis is no evidence, that it has made its first impression on the stomach and duodenum. In the *third* place, the influence of a hearty meal (in cases in which the appetite has not been destroyed), in exciting the Fever, and even developing gastritis, does not prove that the cause had acted on the stomach; for if the organism at large had felt its influence through whatever channel, and the stomach had then been irritated by a meal, which it could not digest, the sympathetic relations between it and the whole system might, at once, arouse inflammation in the former, and fever in the latter. In addition to these objections it may, in the *fourth* place, be asked, how an agent so subtle, as to have hitherto escaped detection, can find its way in the stomach, in such quantities as to prove injurious, either by its action on the mucous membrane or its passage into the blood? It could only reach there, by being mingled with our food and water; which, for aught we know to the contrary, may be the case, but I know not of a single fact in support of this opinion.

III. Action on the Lungs.—If the cause of autumnal fever be mingled with the atmosphere it must be received into the lungs; for universal experience shows that it is not one of those gases which provoke a closure of the glottis, and thereby occasion its own occlusion. Does it then, make its primary morbific impression on the pulmonary mucous membrane? In support of the affirmative of this question, it may be stated, *First.* That the area of that membrane is sufficient to admit of an extensive contact of the aerial poison. *Second.* That its susceptibility to the action of gases is far greater than that of the skin or gastro-enteric membrane; and, therefore, as compared with them, it is more likely to be the surface on which aeriform poisons make their primary impression. It may be objected to this hypothesis, however, that the function of respiration is less impaired in the early stages of this fever, than most of the other great functions, and that bronchitis is but seldom developed. The former is entitled to consideration, but the latter is not, inasmuch as all morbific agents do not necessarily excite inflammation in the parts upon which they act; and, it has not yet been shown, that the cause of autumnal fever is one of those which do. Nevertheless, I cannot regard the opinion that autumnal fever has a pulmonary

origin, as anything more than an hypothesis. As nitrogen, oxygen, and some other gases have been found to enter the circulation through the skin, it is possible that the cause of this fever may be introduced in the same way. Should it be introduced into the stomach and bowels, it might thence enter the blood, as there is reason to believe that certain gases do.* But passing by these surfaces, as altogether subordinate we may turn to the pulmonary, as that through which most gases pass into the circulation. Of the reality of this absorption, no physiologist can entertain a doubt. In fact, it seems to be almost as much a function of the pulmonary membrane, to absorb certain gases and odors, as it is of the gastro-enteric to absorb liquids. Thus Dr. Edwards† has demonstrated the absorption of oxygen, azote, hydrogen, and aqueous vapor, by the lungs. Others have confirmed his observations, and rendered the absorption of other gases highly probable; finally, all the world is familiar with the fact, that a great variety of odorous exhalations are likewise absorbed—often rapidly and copiously. Such being the penetrability of the pulmonary membrane, there is no anatomical or physiological objection to the theory of the passage of the efficient cause of autumnal fever through that tissue into the blood; still, this does not prove that it is absorbed—only that it may be. But there are no proofs of the fact? I know of none, which do more than render it probable. *First.* We have seen, that there is no evidence, that the morbific impression of this cause is made on the skin or mucous membranes with which it is in contact; and yet its action on the system is a reality, hence we may conclude that it penetrates through some surface to the blood. *Second.* As various gases, vapors, and odors, penetrate the thin parietes of the vessels of the pulmonary membrane, we may conclude from *analogy*, that the efficient cause of this fever may do the same. *Third.* Dr. Stevens has shown that, in the endemic fevers of the West Indies, the blood suffers deterioration before the phenomena of fever have manifested themselves in the functions of the solids. *Fourth.* The universality of functional lesion, and, in most cases, its equality among the different organs, in other words, the involvement of the constitution, would seem to indicate, that the remote cause has acted throughout the whole organism at the same time. *Fifth.* A prominent and most dangerous condition in autumnal fever, is the impaired state of the calorific function, found in its highest degree in algid intermittents. As the blood evidently plays an important part in this function, may we not conclude that in these remarkable cases, it has undergone a change in its composition or constitution, which unfits it for the development of caloric! Whatever may be the agency of the nervous system in this function, it is undeniable that the blood is immediately and deeply concerned; and highly probable that its agency is according to chemical principles. Should it then be altered in its constituents, or their mode of union, an alteration in its calorific agency would be inevitable. It must not be forgotten, however, that in the stage of febrile reaction there is increased heat. Nevertheless, there are cases in which,

* Christison, page 698. † Edwards on Phys. Agents.

during that stage, the extremities continue cold. *Sixth.* An argument in favor of this hypothesis may, perhaps be found in the well-known fact that a suppression of perspiration by lodging in the open air, tends to excite the disease, and that a copious perspiration, effected by art in the forming stages, often arrests it. While the function of perspiration continues active, the poison absorbed by the lungs may pass off through the skin; but being arrested in that exit, may, by its accumulation, prove mischievous, and when it has already begun to do harm a copious sweat may relieve the system of such an amount that fever may be averted. *Seventh.* Nearly connected with these views, and tending to the same point, is the fact, that as long as the nights continue warm, the disease does not become epidemic; but as soon as they become so cool as to check the functions of the skin, by diminishing its capillary circulation, and surrounding it with a damp atmosphere, from the liberation, by the reduction of temperature, of a portion of vapor which was insensible at a higher degree of atmospheric heat, the Fever assumes an epidemic character.

SECTION II.

MODE OF ACTION.

SUPPOSING the agent which produces the Fever introduced into the blood through the lungs, what may be its mode of action? Experiments by various physiologists and chemists* have shown, that in reference to their effects upon the living body when inspired, the known gases may be divided into the inert, the irritant, and the narcotic. Of the first class, are azote and hydrogen, which prove injurious entirely or chiefly by excluding atmospheric air. To the second class belong nitric oxide gas, nitrous acid vapor, muriatic acid gas, chlorine, sulphurous acid, and ammonia; all of which irritate in a sensible manner, or inflame the aerial passages, and some of which, in a very dilute state, if inhaled for a considerable time, prove narcotic. In the third group are comprehended sulphuretted hydrogen, carburetted hydrogen, carbonic acid, carbonic oxide, nitrous oxide, cyanogen, oxygen, ether, and chloroform, in which the narcotic greatly predominates over the irritating property.

Judging by its first effects, as found in the early stages of autumnal fever, to which of these classes should we refer the cause of that fever? Not to the inert, which destroy life simply by excluding the atmosphere, for it causes no such exclusion; not to the exclusively irritant, for, as we have seen, they inflame the respiratory membrane; not to the entirely narcotic, for somnolency is not a prominent symptom of the early stage of that fever. Relying on its effects, to guide us in an estimate of its character, we may

* Christison, p. 689.

say, that the efficient cause of this fever is a peculiar poison, of a sedative and irritating quality, somewhat like the narcotico-irritating gases, or certain solid and fluid bodies, which, in large doses, destroy life suddenly, by reducing power, and in smaller portions, weaken while they pervert the functions. *Assuming* this, let us inquire concerning its action, first on the blood, and secondly on the solids.

1. In reference to the blood, we can only regard this agent as something absorbed and mingled with it: a foreign substance united with the water, in which the saline and animal ingredients are dissolved or suspended. Of its effects on these, or the manner in which they are produced, we are profoundly ignorant. Still, as the introduction of a foreign ingredient, into a fluid so compounded, cannot be made without disturbing the equilibrium of its affinities, and changing its isometric character, we are bound to admit a deteriorated condition of that fluid, if the absorption be a reality. From the physiological relations between the blood and the containing solids, from the moment this condition is established, the action of the former upon the latter, must be different from what it is in health; and the change, however brought about, is to disease. The influence of such a blood on the nervous system, and all the organs of secretion, not less than on the heart and vessels, being different from what that influence is, when the blood is in a normal condition, the functions performed by those great structures, are necessarily altered; and here may be the origin, in part, of the first symptoms of the fevers we are considering.

2. But the agent which has passed into the blood, may retain its integrity, and produce effects peculiar to itself, by acting on the parts with which it is brought in contact. These are the entire internal surface of the arteries, veins, and heart. That this surface is of vast extent, we are taught by anatomy; and that its arterial portion, at least, is exquisitely alive to the impress of foreign matter, has been equally demonstrated by experimental physiology. That the heart is endowed with a high degree of irritability, was shown long since by Haller; and that it possesses nerves, has been proved by Scarpa. That the smaller arteries and capillaries are likewise endowed with nerves, has been demonstrated by Lucre;* that they are the seats of the liveliest sensibility, is obvious to every observer; and that the nervous system exercises over their circulatory and secretory functions, a constant and decided influence, has been established by the experiments of Sir Wilson Philip and others; if, indeed, it has not forced itself upon the attention of every observing physician, in the modifications of secretion and calorification, which result from varying states of the innervation. Such is the surface with which the absorbed and undecomposed poison is brought in contact. A surface not protected, like the skin, with cuticle; not limited to a group of organs, and defended with mucus, like the pulmonary or gastro-intestinal membrane; but undefended; more exten-

* Beclard's Anat. Gen.

[illegible] mode of those taken together; found in every organ of the [illegible] most developed in those which perform the most vital functions. [illegible] we concede to the cause of autumnal fever, a peculiar narcotico-[illegible] quality, its necessary effects, in such a mode of application, will be [illegible] which constitute the first stage of that fever—reduction of vital [illegible], obtuseness of sensibility, suspended or prevented secretion, and [illegible] calorification; and from an equal necessity, they will be felt in [illegible] parts of the body, because the agent which produces them travels with [illegible] circulation. We may assure ourselves, that its first effects will not be [illegible], but depression of excitement, by referring to the constitutional influence of foreign matters, liquid or gaseous, when introduced into one of the serous membranes (as a peritoneum, for example), which are always those of depression as well as irritation. If we suppose such matters to be simultaneously introduced into all the serous sacs of the body, we should expect immediate reduction of the vital powers, and early death; though we can conceive of the quantity being so small, that the system would react, and fever and inflammation ensue. I can see no logical objection to this analogy.

4. If we combine these effects, with those supposed to be produced by the altered state of the blood, and with the whole, those which must necessarily and immediately result to that fluid, from the reactive influence of the diseased solids, we have before us the pathological state which constitutes the first effect of the remote cause, and the first stage of the Fever; a stage which the hypothesis (for it cannot be regarded as an established theory) seems adequately to explain; and, by explaining, to commend itself to our consideration and confidence. Having now accomplished the object proposed in this chapter, let us proceed to inquire into the development of the Fever.

CHAPTER IV.

VARIETIES AND DEVELOPMENT OF AUTUMNAL FEVER.

SECTION I.

VARIETIES.

The first effects, or morbid impressions, produced by the remote cause of our autumnal fever, are so nearly the same, whatever may be the subsequent type, that in many, indeed, in most cases, that type cannot be seen through them. In their incipient stages, the different forms of this fever are not, in general, to be distinguished; but as they advance, a difference in type mani-

sive than the whole of those taken together; found in every organ of the body, and most developed in those which perform the most vital functions.

3. If we concede to the cause of autumnal fever, a peculiar narcotico-irritating quality, its necessary effects, in such a mode of application, will be those which constitute the first stage of that fever—reduction of vital energy, obtuseness of sensibility, suspended or prevented secretion, and diminished calorification; and from an equal necessity, they will be felt in all parts of the body, because the agent which produces them travels with the circulation. We may assure ourselves, that its first effects will not be increase, but depression of excitement, by referring to the constitutional influence of foreign matters, liquid or gaseous, when introduced into one of the serous membranes (as a peritoneum, for example), which are always those of depression as well as irritation. If we suppose such matters to be simultaneously introduced into all the serous sacs of the body, we should expect immediate reduction of the vital powers, and early death; though we can conceive of the quantity being so small, that the system would react, and fever and inflammation ensue. I can see no logical objection to this analogy.

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imagined. Remittents of a simple character, on the contrary, as I have already intimated, will cease of themselves; and cannot so certainly be cut short in their early stages, as intermittents. I have not, however, seen, or been able to collect, evidence of critical days in this fever. Its duration, very commonly, is a week or more, rarely a fortnight, except when complicated with manifest inflammation of some organ, or when they manifest a typhous character.

6. Why is it, that the cause, whose effects we are considering, produces fevers of a periodical type? I know not that any answer can be given to this question. It is the specific effect of the remote cause. It results from the relations between that agent and the living system on which it acts. When we can tell how the variolous poison produces cutaneous pustules, the morbillous a rash, and mercury a salivation, we may be able to tell, why autumnal fever is essentially periodical, and not before.

7. Nor is it plain, why the same remote cause will occasion an intermittent in one, and a remittent in another; why one shall have a quotidian, another a double tertian, and another a tertian; or, why several shall have simple, and one a malignant intermittent, when all inhabit the same locality. Perhaps, however, varieties of constitution and exciting causes, with unknown modifications of the remote cause, may be looked to, for a solution of this difficult problem. On the last, my late colleague, the learned Professor Caldwell,* has laid a degree of stress, which might arrest our attention, if the cause of these fevers, in any of their varieties, had been discovered; and, if they did not all prevail at the same time, in the same places.

It might be presumed that the statistics of these varieties of fevers would throw light on this subject. The table, *Vol. II. p.* 20, presents the relative portions of intermittents and remittents at twenty-six military posts. If these be divided into southern, middle, and northern groups, we find that for the southern, the remittents make twenty-one per cent.; the middle fourteen per cent., and the northern twenty per cent. Thus, it does not appear, that temperature exerts an influence on the relative number of intermittent and remittent cases. But may not humidity? Let us consult the table on this point. Six posts around the Gulf of Mexico, give for remittents twenty per cent.; and seven on the Lake shore, give thirteen per cent.; while eight along, or west of the Mississippi, where the atmosphere is dryest, give only ten per cent. From these numbers it would appear, that humidity *increases* the proportion of remittents. But can we adopt this conclusion? I think not; for ordinary observation has shown that remittents are even *more* common than intermittents, on dry ridges, while in deep valleys and other humid localities, intermittents prevail. It must be, then, that while the army reports may be correct as to the aggregate, they are not to be relied on, for the relative number of intermitting and remitting cases. The mean of the twenty-six posts is about eighteen per cent. of remittent fever; but

* Prize Dissertation on Malaria.

from several yearly reports, kindly communicated to me by Dr. Silas Ames, of Montgomery, on the high bluffs of Alabama River, in N. L. 32°, the proportion of remittent cases is about forty-three per cent. of the whole, occurring in his practice. Since these statements were prepared for the press, I have met with a transcript of the records of the Charity Hospital, New Orleans, for seven years, by Dr. Fenner,* which presents the proportion of remittents, at but ten per cent. of the whole! Such discrepancies show how little reliance can be placed on the attempted classification of autumnal fever into intermittent and remittent.

SECTION II.

DEVELOPMENT AND PATHOLOGICAL CHARACTER.

HAVING studied the *modus agendi* of the remote cause of autumnal fever, and enumerated the varieties of type under which it appears, we are prepared to inquire how they are developed. In doing this, we shall regard them as constituting, essentially, one pathological state; and in studying its modifications, we shall become acquainted with the causes of some of the modifications presented in its symptoms, and the varieties of treatment which they render necessary.

I. OF THE FORMING OR COLD STAGE.—This commences with the initial morbid impression, which we have already considered; and, in simple or inflammatory cases, terminates with the access of the hot stage, to be reproduced, on the next or some subsequent day. This paroxysmal character, not less than the symptoms which characterize this stage, shows, that the function of innervation is deeply involved and embarrassed. We may, in fact, admit, that it is the first affected. The state of the circulation, equally indicates that the forces which maintain it, are reduced. The heart is enfeebled, and the co-operative action of the vessels, however it may be exerted, has failed in a corresponding degree. Hence the blood no longer flows in normal quantities, through the more exterior or peripheral portions of the body, but retreats to, or rather remains in, the organs of the cranium, chest, abdomen, and pelvis. Under this condition of the two great functions of innervation and circulation, the secretions become still further impaired, than at the beginning. The perspiration is suspended; and, in many cases, the exhalation from the lungs is reduced, because the respiration is brought down; and the blood seems not to favor the extrication of what is exhaled in health. The urinary secretion is, also, reduced in quantity; and the bowels are not in the soluble condition which indicates a due secretion of the *liquor intestinalis*. But of all the secretions, that of the liver is most affected, or at least the signs of biliary derangement are greatest. A yellow

* N. O. Med. and Surg. Jour., July, 1848.

crasies, predispositions, and the influence of accidental causes, they may all, in certain cases, contribute to the same fatal termination.

II. Of the Hot Stage, or Stage of Excessive Excitement.—Naturally, that is according to the laws of relation between the remote cause and the living system, if the patient should not die, in the stage which has just been described, it is succeeded by that now under consideration, of which it is the pathological cause. The morbid action has taken a turn—the vital forces have risen from their depression, and excitement is reproduced; but it is morbid. To what cause are we to ascribe this change?

1. It is a physiological law, that after depression there shall be elevation. From mere lapse of time, if not too strongly depressed, the organs recover their vigor, and begin to react. Various functions are restored; but they are morbid, in proportion as the cause which depressed them was foreign in its nature from the agents which maintain life. To this tendency—this spontaneous revival of irritability and sensibility—we may ascribe, in part, as least, the revival of excitement, and the production of the hot stage. If the constitution be vigorous, this revival is more likely to take place—if previously feeble, it may be sunk below the point of spontaneous reaction.

2. When the blood is not too much vitiated, its centripetal accumulation may provoke the heart into reaction.

3. We may, perhaps, admit, with Sir Wilson Philip, that the retained sanguineous excretions may, sometimes irritate the heart into reaction; but this would probably only happen in the milder cases, in which that fluid had not become deeply altered.

4. Should the vital properties of any internal organ have suffered less than the rest, the hyperæmia into which it is thrown, may at an early period establish inflammation in it, the very commencement of which would tend to raise the excitement of the system.

5. Lastly, the external and internal stimulations, to which we subject our patients, contribute to the same result.

But in whatever way it is brought about, when death does not happen in the stage of depression, high excitement ensues, and other phenomena, indicating new pathological conditions, offer themselves to our notice.

1. The blunted sensibilities of the patient become morbidly acute—pain occurs in parts not previously affected, or becomes sharp where before it was dull.

2. The heart, in most cases, acts with unwonted force, and the blood is thrown toward the periphery of the body; but circulates with a rapidity which brings it speedily back upon the viscera.

3. The calorific function is not only restored, but becomes excessive, and the intolerance of heat is augmented.

4. The liver acts with uncommon energy, and the secretion and excretion of bile are correspondingly great; at the same time the bilious hue may become

Having considered the origin and mode of invasion of the remote cause of autumnal fever, the nature of the morbid impression, and the consequences of that impression in the production of the cold and hot stages of the various forms, we have continued our generalization to its legitimate limits, and must now, by analysis, resolve what we have treated as one pathological state, into several; that the peculiarities of each may be presented. In doing this, we shall recur to the varieties enumerated in the preceding chapter.

CHAPTER V.

INTERMITTENT FEVER—SIMPLE AND INFLAMMATORY.

MUCH time has been devoted, by the nosologists, to the division of intermittents according to their periodicity. Regarding such classifications as of little practical value, I shall pass them by, and adopt that which seems best fitted to suggest the variety of treatment, which in this country they require. This classification, as already made, is into simple, inflammatory, and malignant; which terms do not represent three different diseases, but grades or modifications of one, which often presents intermediate shades, that obscure the lines of distinction. I shall commence with the first.

SECTION I.

SIMPLE INTERMITTENTS—HISTORY AND PATHOLOGY.

I. HISTORY.—It is quite unnecessary to give an elementary description of this variety. From south to north, its symptoms, progress, required treatment, and sequelæ, have been found substantially the same, and quite identical with those of all other times and countries. Persons of every age are liable to it; the young rather more than the old; and even infants at the breast are by no means exempt. I have not seen but have heard of one congenital case. Its attacks are generally preceded by an exciting cause; such as irregularities in diet, or a debauch; above all, getting wet and cold, or sleeping exposed to the night air. A long ride through the dews of night, or under the hot sun, of an early autumnal day, will alike excite it.

II. PATHOLOGY.—I shall not dwell on the pathology of simple intermittent fever. My firm belief in the existence of a specific, remote cause, has been already expressed. The simplest morbid condition which results from the action of that cause, is the variety of autumnal fever now under consideration. To its cause it bears a relation, not unlike that of small-pox, scarlatina, or epidemic cholera, to the agent which produces that malady.

A stage of reduced and perverted excitement, ending in a chill, with shivering of the muscular system, is followed by a reactionary fever, which ends in a perspiration, to be succeeded by a state of comparative health; the whole concluded within twenty-four hours. The disease may, in one sense, be said to have run its course, when the first paroxysm terminates; and to be, therefore essentially an ephemera. In this respect, it might be compared with epilepsy, which has its forming stage (often very short), its convulsive stage, and its sleeping stage; immediately after which the patient begins to enjoy his usual health. But, unlike the epileptic fit, the paroxysm or fit of fever returns, every day, or every other day, or at more distant intervals. In many cases, this repetition, which at the beginning was daily, comes to be every other day, or every seventh day, or every fifteenth; each paroxysm being shorter than the last. But as each has added to the disturbance of the constitution, when the disposition to recurrence has ceased, certain consequences may remain. *First*, an anemic condition of the blood; *second*, enlargement of the spleen; *third*, anasarca; *fourth*, neuralgia. During the time the paroxysms are thus recurring at stated periods, it may be reproduced at irregular intervals, by exposure to cold and moisture. When *suffered* to recur until it ceases spontaneously, the patient not unfrequently remains ever afterward free from the malady; although continuing exposed to the action of the remote cause. But whether treated or not with medicines, he may experience future attacks of neuralgia, with a quotidian or tertian recurrence.

Simple intermittent fever, never proves fatal but by the lesions which the long-continued repetitions of its paroxysms occasions. The most important of these have been enumerated. Such being the case we know nothing of a particular anatomical character, invariably present in its early stages. We know of no organ affected in advance of all the rest, and radiating a morbid action throughout the whole. We see a disturbance of the whole, in which some may suffer more deeply than others; but *with* them, not *before* them. We see a deep implication of the nervous system, from the first to the last paroxysm, with that kind of involvement of the sanguiferous and secernent systems, which gives us the phenomena of fever; but we do not see the symptoms of inflammation—above all, the evidences of an *antecedent* inflammation. Such is the disease the treatment of which we are now to consider.

SECTION II.

TREATMENT OF SIMPLE INTERMITTENTS.

I. I HAVE met with a number of physicians, who are accustomed to make but little effort to arrest simple intermittents, until their patients have experienced several paroxysms. The reason assigned for this delay was, that the earlier in its course the disease is arrested, the greater is the danger of re-

lapses. This may be true, for the longer time from the application of the remote cause, the less will be its impress; but as the habit of recurrence, in all periodical diseases, is soon established, as much may be lost from that cause, as is gained from the other. Moreover, the patient in whom the malady is promptly arrested, soon lays aside every remedy and begins to expose himself to exciting causes; while he who has suffered long, is disposed to cling to the former and avoid the latter. On the whole I see no reason for delay in resorting to remedies. These I shall include under two heads —Preparative and Curative.

II. PREPARATIVE TREATMENT.—1. *Bloodletting.*—In the beginning of simple intermittents, we often find much vascular fulness, and during the hot stage, a considerable resistance in the pulse, with great heat, thirst, jactitation, headache, backache, and pains in the periosteum of the long bones. Such a concourse of symptoms would seem to indicate a phlogistic diathesis; but in reality they are the expression of a febrile condition only, and in a few hours will entirely cease, to be renewed the next day, or the next but one. Shall we admit that in this condition the lancet is demanded? The answer, I think, should be, that whenever the constitution is vigorous, and the physician is called to an early paroxysm, bloodletting is not only safe, but will both mitigate the symptoms, and prepare the system of the patient for other remedies; which, in many cases fail, or succeed but imperfectly, from the tone and fulness of the vascular system. The blood which is drawn is generally free from buff. It has been affirmed that liberal venesection will of itself cure the disease. This may be true, for sudden and copious depletion will produce great changes in the state of the functions; under which the disposition of the system to return to the morbid condition may be lost. A preference has been given by some physicians* to bloodletting in the cold rather than the hot stage. As far as it relates to the preparation of the system for subsequent measures, it perhaps makes no difference in which stage of the paroxysm the blood is drawn; but as the cold stage is often cut short by the operation, it may be well to resort to it in that stage. It is undeniable, however, that the greater number of simple intermittents can be, and are arrested, in every part of the Valley, without a resort to the lancet.

2. *Emetics.*—In the early settlement of the states bordering on the Ohio River (constituting what was then called the Western Country), when but few Anglo-Americans had, as yet, emigrated into the northern or southern portions of the Interior Valley, emetics were among the fashionable remedies in the treatment of simple intermittents. At that time, it was the custom of every physician whom I knew, to administer them. But for the last twenty-five years, they have been discontinued by many, and but seldom prescribed by others in this form of fever. Has this disuse arisen from the discovery that they are injurious, or even useless? I think not; but from causes

* Dr. McIntosh, of Edinburgh, and many practitioners of the Interior Valley.

entirely different. After the estuaries of the rivers emptying into Lake Erie were settled, malignant intermittents mingled themselves with the simple; and, after the states of Mississippi and Alabama became peopled, a similar combination was encountered; and it was discovered that emetics, by their prostrating influence in these intermittents, often did harm; and that, in the first paroxysms, the simple could not be distinguished from the malignant. Under such circumstances, it became prudent to limit the administration of emetics; and as modes of practice are diffusive among the physicians of every country, this limitation spread into regions where it was not demanded. But another, and, perhaps greater cause of this restriction was, the theory that the disease we are considering, is an intermittent gastritis, in the treatment of which emetics could not fail to be injurious. To these causes we way, I think, ascribe the decline, but not extinction, of the emetic practice.

My own experience, with that of many others, leads me to commend emetics in this form of fever. When the circumstances already recognised as suggesting venesection exist, let it be first employed—when they do not, an emetic may be the first remedy. A free and full evacuation of the stomach is followed by a decided improvement in its condition, by a tendency to sleep, and an abatement of the dryness of the skin, if not an actual perspiration. The emetic may be given during the hot stage, if the arterial system should not be plethoric; or it may be administered in the intermission, or at the access of the chill, which it often shortens, and sometimes averts. In fact, when the disease has lasted for a while, a powerful vomit just before the shake, is one of the successful modes which the people adopt, for arresting the disease. It carries into the system a perturbation, in which the paroxysmal tendency is lost. As a preparatory remedy, an emetic empties the stomach of undigested food, and the acids resulting from indigestion or morbid secretion. Very commonly, however, instead of acids, a liberal quantity of regurgitated bile is thrown up, from the beginning, or at the close of the operation. Great comfort, and much abatement of all manifestations of disease, generally follow such an operation, and the stomach is prepared for the favorable action of other remedies.

3. *Cathartics.*—In the commencement of simple intermittent fever, the bowels are generally sluggish, if not torpid, and charged with feculent matters and bile. A cathartic is, therefore, indispensable, whether an emetic be first administered or not. Of this cathartic, calomel should always be an ingredient, as a complete emulgence of the hepatic ducts, is a desideratum.

The old-fashioned dose of ten grains of calomel with ten of jalap, with or without one grain of tartarized antimony, is equal to any other formula; but calomel, in a dose of ten, fifteen, or twenty grains may be given alone; and after its alterant action has been exerted on the liver, its cathartic effect may be quickened by an infusion of senna, with or without sulphate of magnesia. The best time for the operation to take place is in the decline of the

hot stage. If that stage should be intense or prolonged, the bowels may not be obedient to the impress of the medicine, when a liberal bleeding will bring on free and full purging. In some cases the liver is in a high state of functional excitement; and there is an uncommon development of the elements of the bile. Such a condition is indicated by yellowness of the eyes, a sallow complexion, and a tongue covered with a heavy yellowish fur, large quantities of bile being at the same time brought away by the operation of cathartic medicines. It is quite possible, however, to attach too much importance to the removal of these symptoms, and to be over anxious for a clear and healthy tongue before proceeding to other measures. In short, I can see no sufficient reason for a continuance, through many days, of a treatment which, carried to any extent, will seldom arrest the disease. Indeed, I suppose it would be better to leave the patient to himself, than by the daily repetition of drastic evacuants, to reduce his strength, and irritate, if not inflame, the mucous membrane of his stomach and bowels; for, if brought into such a condition, he would *not* be prepared, but rendered unfit, for the treatment which is essentially remedial.

III. Curative Treatment.—If I should dwell on this head, it will not be on account of its difficulty; but for the purpose of discussing a therapeutic principle, and the *modus operandi* of a medicine, applicable to all the varieties of autumnal fever. Tested by their symptoms, obvious pathology, and the treatment found most successful, these fevers, I may here repeat, cannot be grouped with the phlegmasiæ, or inflammatory fevers depending on common causes, and curable by a routine, antiphlogistic method; for many of them will not yield to that treatment, and others, if sometimes cured, are more tractable under a plan, of which that method is but a part.

As already affirmed, autumnal fever, in all its varieties, is in fact, a peculiar disease, depending on a specific cause, modified in its nature or effects, by causes which are often as little known as the specific cause; and although it may cease spontaneously, or be arrested by various means, which establish in the system a new action, at the expense of the febrile, it does not follow, that among the latter, there may not be some, whose action shall be so antidotal, that of right they should supplant the others, and be regarded as the true and proper remedies. One of these is the cinchona bark, and its preparations. Before the discovery of the latter, the bark was in general use throughout the Valley, and seldom disappointed our expectations; but the fashion of administering it has passed away, and one of the compounds formed from it has come into universal use. That compound I shall take, therefore, as the representative of the cinchona and all its preparations, in the present discussion.

IV. The Sulphate of Quinine.—This medicine cannot be referred to the class of simple diffusive stimulants, such as capsicum or ammonia, which, in large doses, excite inflammation and fever; nor to that of tonics, as gentian, colomba, and the carbonate of iron; for although in minute and regu-

thrown up, we have before us all the data necessary to a practical estimate of the relative value of the two medicines, in the present disease; and omitting a further reference to the latter, I proceed to speak of the *curative* power of the former.

1. *Omission of Preparatory Treatment.*—At the outset it may be asked, whether the sulphate of quinine will cure intermittent fever without the preparatory treatment which has been recommended? The answer must be that it will; for in the South it has of late been frequently administered, as the first medicine, and found successful. This may seem incredible to those, who, adhering rigorously to old ideas, regard evacuation, revulsion, and time, as curative; and the sulphate as a tonic, maintaining and carrying on what they had commenced; but those who see in that medicine, a power of establishing in the system a peculiar action, incompatible with the febrile, will have little difficulty in believing the report that it has often succeeded, without preparative treatment. Regarding the morbid state of the secretions, as the effect and not the cause of the disease, they will consistently suppose, that the best corrective for that state must be the agent which can supersede the febrile action by one of its own. Nevertheless, I believe the preliminary treatment, which has been pointed out, generally advisable, and in many cases indispensable. This remark, however, applies chiefly to the early stages of the disease; for in relapses, no treatment preparatory to the administration of the sulphate, is in general required.

2. *Times of Administration.*—In traversing the Valley, I have met with respectable physicians who prefer to administer the sulphate in the decline of the paroxysm; others who choose the whole period of apyrexia; others who give it shortly before the access of the cold stage; others who exhibit it indiscriminately through the paroxysm and the intermission; and all referred to experience as the test of their preference. It seems to result from this diversity, that it signifies but little, when the medicine is given, provided the system be brought and kept under its impress. That a liberal dose on the decline of the paroxysm, may promote the sweating which then comes on spontaneously, there is no doubt; but it must be borne in mind, that the effects of such a dose upon the constitution may pass away, before the hour for the next paroxysm. The object in view, is to secure the impression of the medicine on the general system, at the time when the cold stage would form. To this end, it would seem important to make a liberal exhibition immediately before that event; and many who pursue this practice regard all that is previously administered, as useless; others, however, apprehend bad effects *in* the approaching paroxysm, from this administration. Relying on my own experience and that of many others, I would say, that whatever previous administration may have been made, the important period of exhibition *is* a short time before the access of the paroxysm—for then is the struggle, to speak figuratively, between the medicine and the disease. The peculiar effects of this agent are temporary, and not like those

At the present time, the practitioners of this country very generally unite opium with the quinine, which they administer before the paroxysms, but in very different quantities. Of those who are in the habit of giving large doses, I may mention Doctors Henry and Merriman, of Springfield, Illinois, who give from three to six grains of solid opium, with about the same quantity of sulphate of quinine, just before the chill, and find, as they assured me, a more certain arrest of the paroxysm than when they omit the opium and double or treble the dose of quinine. If an apoplectic tendency should be suspected, this practice of course, would be improper; while in the case of an intemperate man it would be almost indispensable.

6. *Continuance of the Treatment.*—As to the length of time the medicine should be continued, it is impossible to speak definitely, without being dogmatical. And here I must state, that many persons, including some physicians, cherish a *quasi* prejudice against this medicine, on the ground that, although it will promptly arrest the paroxysms of an intermittent, they are apt to return. In short, that relapses are frequent under its use. My inquiries lead me to adopt this opinion. As already said, the anti-periodic influence of the quinine is temporary, and when it has passed way, the system remaining enervated, slight causes will occasion a relapse. This is no objection, however, to the admitted benefits of the medicine, in breaking up the morbid catenation; with which effects, in many instances, the exhibition of the medicine ceases. If its administration were continued longer, many relapses would be prevented. The indication, however, is not precisely the same after as before the arrest of the paroxysms. Before they are arrested, the object is to establish in the system that peculiar action which is incompatible with their reproduction; but after they are interrupted, the object is not only to keep up the same action, but to restore the strength, and re-establish the functions; to which ends the bark, from its tonic and astringent properties, not less than its anti-periodic elements, is much better adapted. The right practice then is, after having broken in upon the paroxysms with the sulphate, to resort to the bark, and continue its use until the atmosphere of early autumn has passed away, and, in cases showing great tendency to relapse, throughout the succeeding winter. In general, a drachm of the powder taken before each meal will be sufficient.

Dismissing the bark and its preparations as remedies in simple intermittent fever, we must now turn our attention to others, on which so much need not be said.

V. VEGETABLE BITTERS.—Many of our native bitters have been more or less extensively used to arrest the paroxysms of intermittent fever. The favorites are, or have been, the bark of the *Cornus Florida*, or dogwood; *Liriodendron tulipifera*, or yellow poplar; *Prunus Virginiana*, or wild cherry tree, and the herbs *Eupatorium perfoliatum*, or thoroughwort, and *Sabbatia angularis* (formerly *Chironia ang.*), or American centaury. As it was an old professional opinion that the superior efficacy of the cinchona

℞.—Arsenious acid, - - - - - - - grs. j.
Finely powdered opium, - - - - grs. iv.
Mix intimately, and divide into sixteen pills.

Three or four of these pills, in the course of twenty-four hours, are as much as can be long borne. If the disease should not yield, by the time the stomach becomes irritable, with some degree of epigastric tenderness, or the face exhibits an incipient œdema, it is not advisable to continue the medicine any longer. Sixteen grains of sulphate of quinine, added to this formula, will make it as effective in obstinate agues, as any other remedy with which I am acquainted.

SECTION III.

INFLAMMATORY INTERMITTENTS.

I. Diagnosis and Pathology.—Every autumn, in all parts of the Valley, though least in the southern, we see inflammatory mixed up with simple intermittents, but they are far less in number. In this respect, however, different years vary from each other. Thus, in some seasons, there will be very few—in others a large number. There is in such years a phlogistic, atmospheric constitution, giving to almost every form of disease an inflammatory character. The modification of intermittent fever we are now studying, presents us with tension of the pulse, a prolonged hot stage, and an imperfect intermission. But the best diagnostic symptoms, are those which indicate an inflammation of some organ, generally one of the following:—

1. *The Spleen.*—The morbid effects of every variety of intermittent fever on the spleen, are well known to all physicians. In every one of the ten winters that I was connected with the University of Louisville, and delivered clinical instruction in the hospital of that city, I met with lesions of the capsule of the spleen, produced by inflammation. They were generally spots or bands of false membrane. Most of the subjects in which they were found had been boatmen; a class who are exceedingly liable to intermittent fever. From these and other facts, I am convinced that splenitis is frequently present in that disease. It is not, however, the cause, but a contingent of the fever; for the symptoms of splenitis are not present at the commencement of any case, as far as I have seen; and numerous cases run through a long course without their occurrence.

The signs of splenitis are tenderness and pain on pressure over the epigastric and left hypochondriac regions; especially when the fingers are pushed upward behind the cartilages of the ribs; a slight cough, without expectoration, resulting apparently from an extension of the inflammation to the diaphragm; and when the organ is swollen, a dull sound, under per-

the onset of the Fever; or should he be subjected to mental perturbations, after it has begun, some form of cerebritis may be set up. But we must not regard every case of headache, sense of fulness, and delirium, as evidence of inflammation, for such symptoms are not uncommon, during the paroxysm of the simplest intermittent. The acuteness of the symptoms, their increase under succussion and depression of the head to the level of the body, and their subsistence, though in a diminished degree, through the period of intermission, will in general justify the conclusion that inflammation exists. If with these symptoms we have variableness in the pulse, a certain degree of altered expression, with redness of the eyes, and the patient, without being prone to disturbance of mind, under ordinary attacks of fever, is acutely delirious, the existence of inflammation would no longer be a matter of doubt.

The reactive effect of a supervening inflammation, on the Fever, is to increase its acuteness, prevent a full apyrexia, and transform it into a remittent; which may be distinguished from an original attack of that kind, by the history of its commencement, and by the existing signs of an actual inflammation, in some organ. If the inflammation should run high, and, especially, if it should have been induced by an external cause, acting on the lungs or brain, the Fever may assume a continued type; and pass for an original phlegmasia. The inflammation which attacks the spleen, stomach, or liver, above all, the spleen, appears to depend on the same remote cause with the Fever; and does not change the type from intermittent to remittent, to the same extent with the cerebral or pulmonary inflammation.

II. TREATMENT.—If in pursuing a routine practice, the sulphate of quinine be indiscriminately administered, when there is a prevalent atmospheric constitution of an inflammatory character, many cases will be aggravated by it, and in others it will fail. Venesection should always precede its exhibition in such cases; when, the febrile excitement being reduced, the medicine will produce its characteristic anti-periodic effects.

If, however, one of the organs which have been mentioned, or any other should be inflamed, a more extended antiphlogistic treatment will be required to prepare the system for the use of quinine.

Of these inflammations, splenitis yields most readily; a copious bleeding followed in some cases with cupping, or a blister, with the cathartics employed in simple intermittents, will in most cases prepare the system of the patient for a successful administration of the sulphate.

An associated gastritis gives greater difficulty, and must be more completely removed than splenitis, before the quinine is administered. The lancet is, of course, indispensable; and subsequent leeching or cupping on the epigastrium, will be followed by more obvious benefits than in splenitis. Subsequently a blister to the same region will be of great service. In this inflammation calomel is demanded; and will be found more efficacious in

large occasional, than in small and repeated doses. The following formula will be found convenient—

R.—Calomel,
Powdered Gum Arabic, } āā gr. x, mix.
White Sugar.

To be administered every four hours. The bowels should be opened with injections; and all drastic cathartics avoided, together with tartarized antimony and other emetic medicines. As soon as the inflammation and fever begin to abate, one grain of powdered opium may be added to the calomel; after which, the quinine may be administered, as in simple intermittents.

When the Fever is complicated with hepatitis, general and topical bleeding will be proper; but their effects, on the whole, will be less satisfactory, than in splenitis, gastritis or gastro-enteritis. Antimonials, unless there should be a high degree of sympathetic irritability of the stomach, are not objectionable; and free purging will prove useful. The regular administration of calomel should, however, be the main reliance. Five-grain doses may be given every two or four hours, according to the intensity of the symptoms; and continued till they abate, or a salivation is induced. When the inflammation has begun to yield, quinine may be mingled with the calomel, and will soon arrest the paroxysms. The hepatitis, however, may remain in a subacute form, or the liver may fall into a torpid condition and give a tardy convalescence. When this happens, one of the following pills, taken every six hours, will generally complete the cure—

R.—Extract of Taraxacum, - - - - - ʒij.
Mercurial Blue Mass, - - - - - ʒss.
Sulphate of Quinine, - - - - - ʒss.
Mix and make into thirty pills.

The nitro-muriatic bath to the feet and right hypochondrium, will, also, be found serviceable in such cases.

Should the inflammation be determined upon the lungs, the lancet will be indispensable; to which, if pleuritic pain exist, topical bloodletting, and a subsequent blister, may be added. Drastic cathartics will be of little value; but emetic medicines, even to full vomiting, will be proper. Tartarized antimony in large doses may be given, or the squill, in liberal quantities, substituted for it. As the inflammation recedes, the sulphate of quinine may be combined with either of the latter medicines, or with any other sedative expectorant.

It is proper, here, to add a word of caution in regard to affections of the lungs in connexion with intermittent fever. It is well known, that individuals who have experienced attacks of the Fever in autumn, are liable, through the following winter, to relapse; and the change of weather, or exposure, which reproduces the intermittent, may generate an inflammation

of the lungs. But in the South, or in very unhealthy places, that which seems to be an inflammation is often a mere congestion or sanguineous engorgement, returning with the febrile paroxysm. In this pathological condition, which may be recognised by the absence of tension in the pulse, and by the intermittent tendency of the pulmonary symptoms, the powers of the system fail under copious bloodletting; but full vomiting, with the subsequent use of the following compound, may be of great service—

℞.—Tartarized Antimony, - - - grs. viii.
Opium, - - - - - - grs. iv.
Sulphate of Quinine, - - - grs. xx.
Mix and make into eight pills.

One to be given every two or four hours. In addition a large blister to the thorax may be applied with advantage.

If the inflammation be seated within the cranium, a freer use of the lancet should be made, than if seated below the diaphragm. The appearance of the blood will assist in the diagnosis of the case, and aid in a decision as to the repetition of the bleeding. The usual means of subduing cerebritis, such as cupping, elevation of the head, and cold or subtepid effusions, must of course be employed. Of medicines, nothing is equal to copious purging with calomel and jalap; or with calomel and injections, if the stomach should be too irritable to retain the former. The diversion thus created from the brain, in connexion with the evacuation of the contents of the lower bowels, will be attended with the best effects. Counter-irritation with blisters, should the inflammation not speedily yield, will be proper. When an abatement sufficient to justify it has been effected, the sulphate of quinine must be administered; but opium, except in minute quantities, or under unmistakable signs of constitutional irritability, should not be administered. In the complication we are now studying, the disease is, as it were, transformed from an intermittent into a continued inflammatory fever; and when the local affection is removed, there may not be a return of the paroxysms—if, however, they should return, the sulphate of quinine must be administered, as for a simple intermittent.

III. Recapitulation.—I have said all that seems necessary on the history and treatment of our simple and inflammatory intermittents, in their early stages; but they often assume a chronic form, and occasion more perplexity to the physician than in their earlier periods. Hence our study of them is not finished; but, as malignant intermittents and remittents of every kind occasionally terminate in protracted and relapsing intermittents, I propose to include the whole under one head, after we have studied all the varieties in their early stages.

But before entering on the next variety, that I may be understood as to certain pathological and therapeutic principles which will be carried through

from each other than those of the preceding groups. They are all, however, marked with a common character of anomaly or irregularity. The harmony of symptoms, both cotemporary and consecutive, observable in the other groups, is here wanting; or if displayed at the beginning of a case, is lost in its progress. They are still further characterized, in their obvious aspects, by a predominance of the cold stage over the hot; and by a downward manifestation of the vital forces and functions, not to be mistaken by the most careless observer. They agree, moreover, in occurring chiefly in the epidemic period of the year, and in the localities most subject to autumnal fever—those which are branded as most insalubrious; finally, they concur in a strong tendency to an early and fatal termination, when not arrested by art.

In different parts of the Valley, they are known, by the profession, under the general appellation of congestive or malignant; and in their sub-varieties by the terms irregular, misplaced, soporose, or algid, according to the prevalence, in particular cases, of this or that anomaly.

I need scarcely say that this variety of intermittents never constitutes an entire epidemic. It is mixed up with the other varieties; and, in most localities, the proportion which these cases really bear to the others, is much smaller than is generally supposed, at least by the people. Two or three circumstances have contributed to swell the catalogue of cases beyond the truth. *First.* When a case of this kind proves fatal, the neighborhood in which it happens is thrown into a state of alarm, and every attack of intermittent which occurs, is liable to be pronounced of the same kind—thus, by a stroke of the tongue, simple intermittents are transmuted into malignants. *Second.* There are empirics who are willing to profit by this delusion of the people, or even to excite it, and therefore apply the dreaded epithet, congestive, to ordinary cases, for the purpose of magnifying their skill in saving life. *Third.* Physicians, the most skilful and conscientious, are often at a loss to say whether there may not be a lurking malignity in certain cases; and, therefore, prudently speak of them, and prescribe for them, as if they were really dangerous; when, in fact, if let alone, they might take the course of common intermittents.

The regions of the Valley most infested with the fevers of this order, as far as I am now prepared to state, are, *First.* The level portions of Alabama, Mississippi, and Louisiana, including the zone of estuaries around the Gulf. *Second.* The southern shore of Lake Michigan, from Chicago round to the St. Joseph River, and of Lake St. Clair and Lake Erie, from Lake Huron to Lake Ontario, near the estuaries of the creeks and rivers. The intervening region and the country off to the west of Lake Michigan, are, however, not exempt; but the proportion of cases, with the exception of a few limited localities, is much less.

In the early settlement of the states on the Ohio River, examples of this fever now and then occurred, and such is still the case; but neither in early

nor later times were they numerous, except along the lower third part of that river; where they seem to have existed in considerable numbers from the beginning of settlement. Relying on the answers to my questions, concerning the increase or decrease of this fever in the regions where it prevails most, I may say that, in latter years, it has been increasing, and that this increase appears to date from the visitation of the Epidemic Cholera, in 1832–4. Still, from the short time that most of the physicians of the South remain in practice, it is difficult to gather up correct data on this subject. That the cholera-atmosphere *may* have had this effect must be admitted. It was very perceptible in the vicinity of Cincinnati, for two or three years after that visitation; and the history of epidemics, in all countries and ages of the world, coincides with this alleged effect.

No class of persons is exempt from this form of intermittent fever; but both sexes and all ages are liable; and, as far as I know, equally so, under equal exposure to exciting causes.

After these general introductory remarks, we must proceed to take a closer view of this difficult subject, beginning with its symptoms.

SECTION II.

SYMPTOMATOLOGY.

There is not perhaps in the whole range of symptomatology, a more difficult task than that of making a graphical presentation of the symptoms, which accompany and characterize our malignant intermittent fevers. This results from several causes: *First.* Their number; all the functions being morbid. *Second.* Their simultaneous occurrence; as if the whole of the organism had been affected by the direct action of the remote cause at the same time. *Third.* The suddenness of their occurrence on the access of the paroxysm; presenting, in a single hour, transition from a state apparently bordering on health, to one of impending dissolution. *Fourth.* The deep involvement of one great organ in one case—of a different one in another, and a consequent modification of the symptoms. Compared in the diversity of their phenomena with the most malignant cases of scarlatina, typhus gravior, or epidemic cholera, they are decidedly more difficult to portray in a methodical and faithful manner than either. Moreover, their malignity sometimes shows itself by the slightest possible anomaly. Thus a partial numbness, or a coldness of the great toes, instead of a regular chill, or a disposition to sleep at the access of the paroxysm, may be all that suggests anything more than the most harmless intermittent. Hence they stand connected, on the one hand, with a simple ague; while, on the other, they graduate into the malignant remittent type, in such a manner that a separate description would scarcely be worth the trouble, were it not that a

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series of morbid states, however intimately catenated, must be studied in its links, before it can be comprehended in its entireness.

By far the greater number of cases begin as regular intermittents, with a cold fit too slight to excite more than a moderate shivering; such, for example, as ushers in a simple remittent. The cold stage, is not followed, however, by the well-developed and prolonged hot stage of that variety of fever; but by one so inconsiderable, that the patient in many cases is soon upon his feet, and often resumes his business till the next day, or the day after that. If nothing should have been done, the second paroxysm will be more severe; his coldness will be greater and more prolonged, yet not productive of a shake; he may have a considerable degree of drowsiness, or dyspnœa, with a sense of thoracic oppression; his stomach may become irritable, with a sense of epigastric sinking; or some topical sweating may show itself. To these symptoms, but more slowly than the day before, will succeed a reaction of moderate force, and when it ceases, the patient, if not alarmed, will be again out of bed, and, perhaps, occupied. The third, and even the fourth paroxysm may thus pass away; each, however, presenting an increase of intensity in the symptoms, and a full development of them be reserved for the fifth. But this is rare; and, in the majority of cases, the third fit not only discloses the danger of the patient, but often proves fatal; or he struggles through it, to die in the next. The disease, however, does not always advance in this gradual manner. Almost every physician, where it prevails extensively, has met with examples of fatal termination in the second, and, sometimes, in the first paroxysm. Still further, cases of the most simple kind, which, through several recurrences, have shown no sign of malignancy, have, under the unadvised operation of an antimonial emetic, or an active saline cathartic, proved fatal in the next paroxysm. When the dangerous or fatal paroxysm comes on, the functions of the whole body seem blighted.

1. That of innervation is blunted and inactive. But little (and no acute) pain is felt in any part of the body; external applications are not much regarded, and even the cuticle, as I have seen, may be torn off, by rough frictions, without attracting the attention of the patient, although neither asleep nor delirious. The organs of special sensation are equally impaired. The intellectual functions, and the feelings, and affections of the mind, are passive; and the expression of the countenance is vacant or stupid. In some cases, a considerable degree of delirium supervenes; but in others, the faculties of the mind, almost up to the moment of dissolution, show nothing more than inactivity. Should there be some degree of delirium, the disposition to action will of course be greater. In many cases, however, the patient sinks into a coma, from which it is difficult to arouse him, and into which he immediately relapses, and continues until the paroxysm passes off, or he expires. These of course are the soporose, or apoplectic intermittents of systematic writers.

less and pale, sometimes the extremities will assume a dark red, and the spots on which pressure is made will remain white for a time, indicating capillary stagnation.

7. Lastly, the greatest reduction of energy is, perhaps, in the calorific function. The heat of the extremities, and occasionally of the integuments of the trunk and head, is signally reduced. It seems as if none were developed in the system, and as great exhalation is constantly going on, from the surface, external applications, both potential and actual, designed to raise the temperature of the extremities, very often produce no effect. In the midst of this reduction, the patient will neither shiver nor complain of cold, but on the contrary, if not deeply comatose, may declare that he is burning up within, and call incessantly for water. Every case, however, is not attended with this remarkable loss of heat. Those which manifest it most, must be classed with the algid intermittents of the systematic writers.

A patient in the condition here described, must of course emerge from it in a short time, or die. He who might have the greater part of the symptoms, which, for the purpose of a full narrative, have been detailed, cannot, of course, be extricated. But a majority of them may be present, and yet recovery take place. In no other form of fever could this occur. In this, it results from the periodical and paroxysmal character of the disease. As the violent symptoms attendant on the cold stage of a simple intermittent, give place spontaneously, to those of the hot stage, which, in a few hours, as spontaneously cease, and are followed by a complete intermission; so there is, in malignant intermittents, a tendency to reaction and subsequent intermission; and these will occur in every case, in which the depression has not gone beyond certain limits, nor any vital organ sustained a lesion of structure or function, from which it cannot recover. To this inherent and inalienable property, we must ascribe, as to a *causa sine qua non*, the revival of the organism from its depressed and perverted condition: without it, the physician would neither have ground for hope, nor encouragement to effort.

Nothing is more common, than for medical gentlemen, where the worst cases of this fever prevail, to describe it, as a compound of the cold and hot stages; which, losing their natural relation of sequence, are, to speak paradoxically, present at the same time; the pathological condition of the cold stage, prevailing in some of the functions—of the hot stage, in others; according as the reaction is not, or is, awakened. No exhibition of symptoms, could more impressively declare the extent to which an external cause had violated the laws of the organism. The prognosis of the case, is drawn largely from an analysis of these phenomena. In proportion as the signs of reaction augment, is the prediction in favor of recovery; while, according to their feebleness, and limited extent through the system, is the prophesy of a fatal issue. In a simple intermittent, all the symptoms of the hot stage, arise nearly at the same time, and harmonize with each other, while

very commonly the case. When, however, any great organ has suffered injury during the paroxysm, the recovery will be impeded; and, even, a relapse may be the consequence. That organ may be the brain, when the intellectual functions will be, to a certain degree, stultified; or the lungs, producing more or less of cough or dyspnœa; or the stomach, which will remain irritable, and incapable of a due performance of its functions; or the bowels—affected with diarrhœa; or the liver, which will mark the system in its own peculiar manner; but of all the organs, the spleen appears to suffer most: and often remains enlarged, and sometimes tender for a considerable period of time. Thus after all the symptoms of the constitutional disease have passed away, those of a local affection may remain.

As illustrative of several parts of the symptomatology through which we have travelled, I will here introduce the following case, which fell under my notice in Springfield, Illinois.

Case.—September 6, 1844, at 10 o'clock in the morning, was invited by Doctor Merriman, to accompany him in a consultation to which he had been called, by one of his brethren. The history of the case, as well as we could make it out, was as follows:—The patient, a robust and hale countryman, not yet of middle age, residing fifteen miles in the country, felt unwell, on the evening of the first instant, while on his way to Springfield, which he reached the next morning. He was then chilly, but kept about the town till noon, when a fever came on. It abated, and in the evening of the second, he had another chill followed by fever. The next day (third), he had perspiration and was much better, in which condition he still found himself on the morning of the fourth. In the afternoon of that day the chill returned, and his hands and feet, with his legs up to his knees, became cold, and continued so, till his death. His stomach on that became irritable, and he vomited, occasionally, for twenty-four hours, that is, till the evening of the fifth. The next morning (sixth), when I saw him, at ten o'clock, he was restless in the extreme; his forehead was warm, but not moist; his face was overspread with a copperish hue; his eyes were suffused and vacant in expression. His hands and wrists were cold and sodden, but scarcely moist; and exhibited the appearance of *post-mortem* congestion,—the dark reddish patches becoming, and for some time remaining, white from pressure. His feet and legs displayed nearly the same appearance. The trunk of his body had its natural heat. The pulse of the right wrist had ceased; that of the left was feeble, moderately full, tolerably regular, and one hundred and four in a minute. There was no pulse behind either ankle. His carotid arteries beat feebly. The impulse of his heart was weak, and the sounds reduced. On percussing his chest, I found the resonance loud and hollow, even over the region of the spleen. His respiration was a little bronchial. He had frequent sighing, but no cough or hiccup. He had no abdominal tumefaction or tenderness, and no diarrhœa. There was some ragged fur on his tongue, which, with his gums, had a very tolerable cherry-

he said he was dying, and in fact expired—having complained of severe pain in his bowels, a symptom which existed in the paroxysm of the preceding day. Not long afterward, a daughter, two or three years older, laboring under the same form of fever, was attacked with convulsions, accompanied with hemiplegia, and after several repetitions, throughout the intervals of which she remained senseless, she expired. Two other children and the mother are recovering. One of these children, according to the statement of the mother, had a paroxysm of the fever when it was but three days old. Of the two that died in the city, Doctor Ridgley was permitted to examine the body of one only, the boy, but had not an opportunity of inspecting the brain or spinal marrow. The mucous membrane of the stomach and bowels was free from inflammatory lesions. The liver was unusually firm, and of a leaden color. The spleen was dark-colored, engorged, and enlarged.

"The whole family had been treated, before they came to Cincinnati, with the sulphate of quinine, and bloodletting, both general and local, had been omitted. The Doctor and myself are of opinion, that the whole, at first, required the lancet; and suppose that to its omission, and the early and empirical administration of the sulphate of quinine, the sinister termination of most of them might be fairly attributed."

SECTION III.

PATHOLOGY AND COMPLICATIONS.

I. PATHOLOGY.—So much was said in the preceding chapter on the production and pathological character of the first and second stages of autumnal fever, that but little remains to be added here. A malignant paroxysm is little else than the cold stage of an ordinary intermittent, deepened and prolonged. The innervation is scathed, the circulation is enfeebled; the blood, largely retained from the more external parts, circulates with difficulty through the internal or visceral system, which is rendered plethoric, and the great organs, as the stomach, spleen, liver, lungs, heart, and brain, are, respectively, liable to pernicious engorgements or obstructions, greatly increasing the danger. A failure in the function of respiration, in the co-operative action of the brain, and in the projectile power of the heart, combine to diminish the aeration of the blood; which, deteriorated in its constitution, contributes still further to sink the powers of life. This condition of the respiratory function diminishes the heat of the body, which is, moreover, reduced by the failure of the calorific function of the skin, from the combined lesions of the nervous and circulatory systems; while the ready transudation which the relaxed integument permits, of the serous portion of the blood, and the copious exhalation which takes place, accelerate the cooling. Thus the patient dies under the combined influence of depression

as in health, the loss of blood has that effect, seems quite certain. But is it followed by such an improved condition of the vital properties and powers in malignant intermittents? That it frequently is, in simple intermittents, when a severe chill is rather prolonged, has been shown by Dr. Mackintosh,* and the experience of a number of our physicians goes to the same point. But does such an effect follow its use in malignant intermittents, unattended with great congestion of the lungs or brain? To this question a large majority of our physicians give a negative answer. There is a degree on the scale of vital energy, to which the functions often sink in the cold stage of this disease, which renders bloodletting not only inefficient as a means of restoring the exhausted excitability, but causes the patient to sink more rapidly. When the forces of the system are above that grade, when the danger from exhaustion and collapse is not imminent, the loss of blood may favor reaction; but precisely, when assistance is most needed, it generally fails to afford any. It is to the north, in the basin of the Lakes, as might be expected, that the efficacy of this remedy has been most apparent. To the south, so great is the enfeeblement of the heart and arterial system, that reaction will not in general follow.

2. *Emetics.*—It is well known that full and free vomiting is very often followed by an increase of the excitability and sensibility of the stomach; and, through it, of the whole system. Hence emetics, *prima facie*, would seem adapted to this stage of malignant intermittents, and they have, in fact, been often prescribed. But, on the whole, their effects have not been salutary. In cases not very violent, and administered under certain restrictions, they have often, it is true, been followed by early and general reaction; but their sinister effects have greatly limited their use, and deserve to be recorded. *First.* The nausea, protracted when the stomach is torpid, which precedes vomiting, sinks the powers of the system still lower. *Second.* When the vomiting takes place, it becomes, in certain gastric cases, excessive and irrepressible. *Third.* Instead of vomiting the patient, or after having done so, the medicine is apt to turn upon the bowels, and produce a watery diarrhœa, or hypercatharsis, under which the patient sinks. This is especially true of tartar emetic; which, at the same time, reduces the vital forces; and, therefore, over the South generally, is regarded as a most dangerous medicine in this fever. The objections to ipecac. are not so great, and it is, occasionally, employed with advantage. Of the whole class, however, the stimulating salt and mustard emetic, is the least dangerous, the most likely to do good, and the oftenest employed.

3. *Cathartics.*—Hydragogue cathartics are regarded as inevitably fatal. Doctor Boling, of Montgomery, told me that he had known six patients killed with a solution of epsom salts and tartar. In cases preceded by costiveness, moderate purging, with blue mass or calomel, combined with extract of

* Principles and Practice of Medicine.

though the *media* of air, liquids, and solids. When we are cold, the approach to a fire speedily warms us, and we look to the same result in a malignant intermittent; but are often disappointed. The reason is obvious. The organized body, living, dying, or dead, is an exceedingly imperfect conductor of caloric; and, when we are suddenly warmed after exposure to cold, being at the same time in health, it is partly because the loss of caloric was superficial, and partly because the applied heat stimulates the calorific functions into increased activity, or reaction; whereby caloric is developed in the structures, as well as received by them from without. But in the sunken state of the vital properties, this stimulus often fails to re-excite the calorific function, and all the warming that follows on our applications, is superficial and temporary. Sometimes, indeed, *none* can be observed, for the great exhalation which is going on from the skin, and which is actually promoted by the more rapid evaporation of the escaping vapor, under the influence of the caloric we apply, tends to prevent any rise of temperature; and this will especially be the case when dry heat is applied, and the atmosphere at the same time has access to the surface. Baths, extensive cataplasms, or the application of flannels wrung out of hot fluids, and so covered with oiled silk or India rubber cloth as to prevent evaporation, are, therefore, the best modes of applying caloric. Nor need their temperature, in these modes, be many degrees, or indeed, any above the natural heat of the body; as Dr. Edwards* has proved that heat tends to destroy the irritability of the muscular fibre, already greatly reduced in these cases.

I have seen immersion in a general hot bath, made stimulating with mustard, salt, and whiskey, fail to produce the least reaction; and have, also, seen the entire body wrapped in blankets, wrung out of a spirituous decoction of bark equally ineffective, although applied as hot as they could be borne by the hands of the nurses, and evaporation from them prevented.

2. *Cold.*—The gentleman just quoted has shown that cold tends to preserve the irritability of the fibre, and what has that effect may, within certain limits, be presumed to augment it when reduced. The sudden application of cold, moreover, acts strongly on the nerves of the skin, which are endowed with a peculiar or specific sensibility to caloric; if then cold water be thrown upon it, excitation will be the consequence, unless the patient be past reaction; but the effect will, perhaps, be transient, and by continuing the application too long, the loss of caloric by abstraction may do harm. Finally, the cold dash tends to re-excite the languid function of respiration, whereby excitement and heat may be generated. There are three modes, then, in which cold may prove beneficial in these cases. But not to decide anything *à priori*, when we can appeal to experience, let us inquire into the results of this practice.

The Western Journal† contains a paper by Dr. Achilles Whitlocke, of North Alabama, on the cold dash in malignant intermittents, from which I

*Influence of Physical Agents. † For January, February, and March, 1837.

system are sunk still lower by the depletion. In addition to bloodletting, or as a substitute, scarification and cupping, or extensive dry cupping, over the chest may be employed; after which, the parts may be as extensively irritated with sinapisms or blisters. Of internal medicines, ipecac, or that medicine with opium, or the wine of ipecac with laudanum and ammoniated alcohol, would seem to promise most. I do not know that the inhalation of steam, rendered stimulating with vinegar or aromatics, has been tried; but, *à priori*, it would appear likely to prove beneficial.

3. The stomach may be the chief seat of local irritation and congestion, when incessant vomiting tends still more rapidly to sink the already smitten vital forces. In this condition, large doses of calomel, opium, and capsicum are most to be relied upon, while epigastric cupping, or strong counter-irritation, have been found serviceable.

4. The diarrhœa occasionally present in the malignant paroxysm, may, perhaps, be the sign of a congestive tendency to the intestinal mucous membrane. The prescription just mentioned is proper in such cases; or liberal doses of opium and acetate of lead, with astringent and narcotic injections, may be employed.

5. The liver, undoubtedly, suffers very frequently in this paroxysm, becoming engorged and sometimes perceptibly enlarged. The secretion and excretion of bile are suspended, and, in some instances, bilious appearances manifest themselves in the eyes, the skin, and the urine. Of course, under such circumstances, a liberal administration of calomel or the blue mass, with or without opium, capsicum, or some other stimulant, is never neglected. I do not recollect to have learned that any physician has tried sponging the trunk of the body with a hot and strong nitro-muriatic solution, in such cases; but, as it would be a powerful counter-irritant, and might exert some specific influence on the liver, it seems worthy of a trial.

6. That the spleen is generally engorged in malignant paroxysms, can scarcely be doubted. It sometimes projects beyond the cartilages of the ribs during the paroxysms, and, of all the *sequelæ* of the disease, an enlarged spleen is the most common; almost the only one, indeed, which remains for any considerable time. Of the different congestions, this is, perhaps, the least dangerous; and may even save more important organs from the same pathological condition.* I know of no special treatment directed upon this organ during the paroxysm.

Such are the chief local affections attending the malignant paroxysm, and the most approved means of removing them employed by our physicians. That these local affections often prolong the paroxysm, and increase the difficulty of exciting reaction, must be admitted. It is still more obvious, that they are frequently the immediate cause of death, especially when seated in the brain or lungs. I have spoken of them as simple congestions, but *post-mortem* examinations in Europe have demonstrated, that in the

* Doctor Rush.

majority of our physicians, influenced, perhaps, to some extent by popular aversion and prejudice, have not employed it.

The sudden alternation of hot and cold water, would, perhaps, be more efficacious than the exclusive use of either. I have not, however, met with any physician who had resorted to this powerful means of restoring lost excitement.

III. INTERNAL STIMULANTS.—Almost every kind of excitant and narcotico-stimulant, has been administered, internally. In this stage of the paroxysm of malignant intermittent fever, wine, brandy, whiskey, and other alcoholic drinks have been liberally given; but the results have not been such as to commend them. They probably act unfavorably upon the brain. The acrid and aromatic stimulants, such as capsicum, and the oil of black pepper, cloves, and cinnamon, are not liable to this objection, and continue to be in general use: an evidence that they have not been found prejudicial; and doubtless they have sometimes proved serviceable. Camphor and ammonia are likewise used; a considerable number of physicians testify in their favor. On the whole, however, opium has, perhaps, been more constantly employed than any other medicine; and appears to be harmless (if not very obviously beneficial), when not contraindicated by the state of the brain. When the bowels are torpid, its use is apocryphal; but if there be watery diarrhœa, by no means an uncommon complication, its effects are every way precious; to obtain them, however, it must be administered in very large doses. Finally, the sulphate of quinine has been repeatedly and copiously prescribed during the paroxysms; but not, on the whole, with much benefit. Such at least is the result of my inquiries; to which I must add, that quite a number of physicians have, as they think, found it injurious, from its depressing the vital forces still lower.

Stimulating and anodyne enemata have not been omitted; but it seems that when the stomach is insusceptible to the action of medicines, the rectum is nearly in the same condition. When, however, there is diarrhœa, astringent and narcotic injections have done good.

Such are the measures in general use for establishing reaction, in our malignant intermittents. Their variety is great, and they are, in most cases, applied with that energy which is characteristic of our physicians; but the results of their employment have never been encouraging; and I see no ground of hope for greater success, from the use of other untried agents. The difficulty lies in the state of the vital susceptibilities during the paroxysm.

IV. MEANS OF RELIEVING THE INTERNAL ORGANS.—To relieve the organs which are in a state of congestion or incipient inflammation, is the second object. In the majority of cases, the pathological condition is that of congestion only. This condition connects itself with the paroxysm, of which it makes in many cases a momentous element. I propose to speak of the organs, *seriatim*, in which it occurs, beginning with—

system are sunk still lower by the depletion. In addition to bloodletting, or as a substitute, scarification and cupping, or extensive dry cupping, over the chest may be employed; after which, the parts may be as extensively irritated with sinapisms or blisters. Of internal medicines, ipecac, or that medicine with opium, or the wine of ipecac with laudanum and ammoniated alcohol, would seem to promise most. I do not know that the inhalation of steam, rendered stimulating with vinegar or aromatics, has been tried; but, *à priori*, it would appear likely to prove beneficial.

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* Doctor Rush.

a. We have already seen, that the sulphate will not produce its specific influence, if administered *in* the paroxysm. Now it sometimes happens in quotidians or double tertians, that the intermission is so short and imperfect, that the medicine cannot make its proper impression on the system.

b. When the hyperæmia, either passive or active, of some great organ, survives the paroxysm, it may prevent the successful administration of the medicine in the intermission.

c. In cases accompanied with gastric irritability, the stomach may refuse to retain a sufficient amount of the medicine, to arrest the paroxysms.

d. The physician may be called in, when the access of the fit is so near, that the recurring debility of the system may be established, before the medicine which he administers can take effect.

e. He may, through ignorance, timidity, or a false theory, exhibit the medicine, in insufficient doses.

f. A predisposition to apoplexy, or habitual feebleness of constitution, may render the exhibition ineffectual.

g. Do morbid accumulations in the stomach ever countervail the beneficial influence of the medicine? It cannot be doubted, that an alterant of any kind, is more effective, if the stomach be empty; but such a condition of the organ as follows the operation of an emetic or cathartic, cannot be regarded as indispensable to the successful action of the sulphate. If patients have died, because of an unprepared state of the stomach when the medicine was given, I cannot doubt, that a still greater number have been lost, by the delay and the debility occasioned by a course of evacuation from the stomach and bowels, *designed* to prepare them for the reception of the antidote.

The physician who suspects that he is grappling with a malignant intermittent, should be on his guard in reference to such evacuations. He should fully realize the great truth, that antimonial preparations and saline cathartics, are often the immediate, or exciting causes, of a malignant paroxysm; and that cases, apparently, of the simplest character, are often transformed into the most dangerous, by their debilitating influence.

2. *Quantity and Intervals of Exhibition.*—When the sulphate of quinine was first introduced among us, it was given in one or two grain doses, in ordinary intermittents, and, seldom, in more than double that quantity, for the arrest of the most malignant. The periods of exhibition were every two, four, or six hours, according to the apparent gravity of each case. But although such portions might have proved successful in ordinary intermittents, they were soon found to be insufficient for the malignant; and the practice of giving the medicine, in what would once have been regarded as fatal portions, is now almost universal. Yet, even at an early period, a few physicians went far ahead of their brethren; and the late respectable Doctor Perrine, deserves to be named as one who, twenty-five years ago, in the State of Indiana, led the way in this bold medication. To make known the extent

tions, yet claim as much success as those who do; and I know not that their claim is groundless. *Second.* But in very violent and dangerous cases, as the medicine *may* be administered in great doses without any empoisoning effects, it would certainly be prudent to give it liberally.

In ordinary cases, a scruple taken in one intermission, will, I think, according to the experience of our profession, be found sufficient; and with the adjuvants to be presently mentioned, even half that quantity may often answer. But in cases of a threatening character, forty or sixty grains should be given in the same space of time. Whether any advantage is ever derived from going beyond that quantity, is, I suppose, an open question.

Much diversity of opinion and practice exists among us as to the distribution of the medicine through the period of intermission. I need not repeat what was said on this subject, when speaking of simple intermittents. My own mind inclines to large doses, and long intervals; but, whichever may be adopted, the patient's system should be strongly impressed by the medicine, at the time for the recurrence of the paroxysm; and to secure this, a good proportion of what is used should be administered a couple of hours before the end of the intermission. Thus, if a scruple should be the aggregate quantity, one half ought to precede the chill, and whether the other half should be given in ten, five, or two grain doses, is, perhaps, a matter of indifference.

II. OPIUM, or the SULPHATE OF MORPHIA, is in general use as an adjuvant to the sulphate of quinine, in our malignant intermittents. Of its great value no physician of experience, in those diseases, can entertain a doubt. If there be no diarrhœa, however, it is not necessary to administer it throughout the intermission, but reserve it for the last dose of the sulphate, before the approaching chill. The quantity in which it is then given is often entirely too small, and much better fitted to simple intermittents, in which the susceptibilities of the system are lively, than to those in which they are greatly reduced. In such a state of the system, three or four times as much as would be required in an ordinary ague, is not a *large* dose. I have met with many physicians who had a just appreciation of this state of the system; but with none who carried the practice, logically deducible from it, so far as Doctor Merriman and Doctor Henry, of Springfield, Illinois. It has grown into a settled opinion with those gentlemen, that a moderate quantity of the sulphate, combined with a large quantity of opium, is the very best practice. Hence through the early periods of the intermission, they do little or nothing; but, three or four hours before the chill, administer a bolus of four grains of opium and eight grains of the sulphate, which, as they affirm, scarcely ever fails. Dr. Henry has even found that doses of opium, without the other medicine, successful. Doctor Jayne pursues the same practice, but generally limits the opium to two grains. While I was in Springfield, the next morning after the death of the man whose case is given, page 78, and who had not been treated on this plan, Doctor

Merriman invited me to see one of his own patients. She had labored for several days, apparently, under an ordinary quotidian, and, by the advice of an empiric, had been copiously purged. This brought on a very dangerous paroxysm, from which, however, she recovered, before Doctor Merriman was called in. As it recurred in the morning, he directed that, in the latter part of the night, she should take his ordinary portion of four grains of opium, and eight of sulphate of quinine. At nine, A.M., four hours afterward, I saw her. She had a slight degree of drowsiness, said she felt comfortable, her eyes were a little red, her pulse was well sustained, and her skin pleasantly warm. The next morning I called again, and learned that the paroxysm had been averted, and she was recovering. Doctor Shanks, of Memphis, has also found opium very valuable, but distributes it throughout the intermission. He has given as high as twenty-four grains, in the twenty-four hours, with decided advantage.

Neither my own experience, nor the facts I have been able to collect from others, enable me to decide between opium and the sulphate of morphine, in the treatment of malignant intermittents. The former is, perhaps, the more durable, the latter more coincident with the sulphate of quinine, in its effects. In many cases its limited bulk may render its administration easier than that of opium.

III. Arsenious Acid.—I have met with a few physicians who had combined arsenious acid with the sulphate of quinine, in the treatment of malignant intermittents, and found it beneficial. Whether, in union with opium, the sulphate being omitted, that compound would succeed, is not known. When the approved anti-periodic is scarce, it would certainly be well to give opium and arsenious acid, liberally, throughout the intermission, and the sulphate with opium near its close. In such cases, the arsenic should be used in larger doses than for simple agues. An eighth of a grain, with a grain of opium every two hours, could not be too much.

IV. Piperine and the Oil of Black Pepper have been added to the sulphate of quinine; and many physicians think well of the addition, especially of the latter. I am not aware, that either of them has been relied upon to the exclusion of the sulphate. Capsicum, in doses of two or ten grains, has been combined with the latter; and, in cases of great exhaustion, the union of that local stimulant may give effect to the principal medicine.

V. Calomel is a common adjuvant of the sulphate; and a favorite prescription with some, is a bolus of ten grains of each of those medicines, and a grain of opium every two or three hours; during the intermission, when there is a watery diarrhœa, or signs of engorgement, torpidity, or other derangement of the liver, the use of calomel or the blue mass is certainly indicated; but, in the absence of such symptoms, that medicine does not appear to be required; as it certainly exerts no power as an anti-periodic, whatever may be its value as an antiphlogistic.

VI. Regimen and Relapses.—Whatever modification of the treatment

here detailed may be adopted, I cannot doubt the indispensable necessity of the patient being kept in bed, and restrained from conversation and every kind of occupation, for the purpose of maintaining the warmth and capillary circulation of the skin, and promoting a gentle but sustained diaphoresis. Through the ignorance and restlessness of patients, seen but seldom by their physicians, from being scattered over the country, these salutary observances are perpetually violated, and the wisest methods of treatment thereby rendered abortive. Nothing is commoner, than for men to be walking about up to the access of a most dangerous paroxysm. A man, whose case was mentioned to me, stood up and shaved himself only fourteen hours before he expired; and many undress themselves and go to bed, to die before the next day. No sound pathologist would expect to see a patient, who kept on his feet during the intermission of such a disease, preserved from its fatal effects. After having escaped one paroxysm, the necessity for close confinement is less urgent; but, still, before the period for the next, the patient should be warm in bed, and if possible, asleep.

In some cases a relapse may be malignant, when the original attack was simple; of which I saw an example in a patient of Doctor Rouse, Peoria, Illinois:—

Case.—Maynard, a citizen of Kaskaskia, in that state, suffered an attack of intermittent fever, from which he had tolerably well recovered, when he set off to Peoria. On the journey he was exposed to a hot sun and relapsed. On the 14th of September, 1844, when Doctor Rouse saw him, in the paroxysm, he had copious vomiting and purging of bile, and was very cold. On the 15th he experienced another paroxysm of the same kind. On the 16th when I was invited to see him, he was in a third. I found him nearly pulseless, and the force of his heart very feeble. His respiration was bronchial, and attended with a kind of vibratory purring, recognisable both by the hand and ear. His extremities and tongue were cold. The latter was moist, and stained of a dark color, by a fluid, which resembled finely powdered coffee-grounds, mixed with mucus, which he brought up by a kind of eructation. His intellectual functions were nearly unimpaired, though he died an hour afterward.

SECTION VI.

CONCLUSION.

I SHALL conclude the subject of malignant intermittents with the following observations:—

I. I have several times used the word collapse, to indicate the state of the system in a very dangerous or fatal paroxysm. Since the year 1832, that term has been associated in the public mind with epidemic cholera, and can scarcely be used without suggesting that disease. In employing it in

the history of malignant intermittent fever, it is by no means misapplied; for the failure in the power of the heart, the reduction of animal heat, the stasis of blood in the skin of the extremities, and the *post-mortem* spasmodic contraction of the muscles of the extremities, observed in some instances, are so many points of identity in the two diseases. But there are still some others. Thus, as we have seen, the subject of malignant intermittent fever may keep on his feet, and even attend to business, up to the access of the fatal paroxysm, as the victim of cholera is wont to do, while laboring under the diarrhœa, which may be followed by collapse and death in a few hours. Such patients seem alike unconscious of their condition, and incredulous of the predictions of danger. In the final stage, when death is impending, their intellectual functions are often unimpaired, or simply reduced to an aspect of stolidity, while their feelings and emotions are subdued into apathy. Further, these maladies, so constantly fatal when they reach a certain stage, are, even immediately before its arrival, controllable by very simple and nearly the same measures. Finally cadaveric examinations have disclosed occasional vestiges of inflammation in both, but not of sufficient extent to account for the fatal termination.

There are, however, two striking differences. *First.* The Fever has an indigenous cause, annually reproduced, and is confined to certain localities; but the cholera depends on a cause, which occasionally visits countries distant from those in which it is elaborated. *Second.* The Fever is, essentially, periodical, while the cholera consists of a single paroxysm.

II. The well known fact, that in the midst of many cases of simple intermittent, not proving fatal, although but little shall be done, there may be a few which assume a malignant character, perplexes both physicians and the people. But this trait of character is not peculiar to that fever. It is equally true of yellow fever, cholera, scarlatina, and all other diseases which have an epidemic prevalence. The whole, in this respect, are under one law, which doubtless connects itself in part with diversities of constitution.

CHAPTER VII.

REMITTENT AUTUMNAL FEVER—SIMPLE AND INFLAMMATORY, CONSIDERED TOGETHER.

SECTION I.

SYMPTOMS.

I. Diagnosis.—If we suppose an ague-shake to be reduced to a mere chill, but the subsequent hot stage aggravated and prolonged, we shall form a just conception of the relations, in symptomatology, between intermittent

and remittent fever. We have studied the former under two heads, but I propose, in treating of the latter, to blend under one head, all the cases which are not designated as congestive or malignant.

In general, a remittent is preceded by a forming stage of one, two, or three days, in which there is an increasing languor of the muscular system; inefficiency of body and mind; defective perspiration; rigors, sometimes alternating with flushes of heat; a torpid state of the bowels; increased or diminished secretion of bile; a bilious hue of the eyes; loss of appetite, nausea, and in many cases bilious vomitings; a foul and generally white tongue, having sometimes a tint of yellow; in most instances a dull pain in the head and back. After these and various kindred symptoms of debility and perversion, in the different organs of the body, have continued for a while, the rigors are, as it were, concentrated into a chill, which may or may not amount to shivering; the patient now becomes thirsty, or, if so before, the desire is increased; his nausea is generally augmented; his pulse increases in frequency, and his headache grows worse. In a few minutes, or an hour or two, the chilliness ceases, and is succeeded by febrile heat, over the whole surface, but especially in the head, the pain in which, as in the back, becomes more acute; the mouth loses much of its moisture; the white fur on the tongue rapidly augments; the epigastrium becomes tender; the secretion of urine lessens; and the pulse acquires preternatural frequency, force, and fulness: there is also intolerance of hot and confined air; a tendency to deep inspiration, or sighing, and great restlessness. The chill generally occurs between midnight and noon, commonly in the forenoon, and the hot stage, of which I have drawn the character in brief outline, runs on till after midnight, when it begins to abate; and, by morning, the patient is found with greatly diminished heat, and a limited perspiration; his pulse has become slower, and lost its preternatural force; his thirst has diminished, and he is more or less inclined to sleep. Feelings of health, however, are not present; there remains a dull aching of the head and back; the epigastrium is more or less tender, and pressure upon it may excite nausea; in short the patient has not passed into a state of intermission; but returned nearly into the condition which preceded the chill, the day before. After continuing in this state a few hours, an increase of thirst, headache and frequency of the pulse, usher in a second chill, which, instead of being more, is often less violent, than the first; and is soon succeeded by the full development of a hot stage, commonly more intense than the preceding; which is succeeded by a remission, not quite as great as that which followed the first paroxysm. In this manner, the exacerbations and remissions, are repeated daily; the former being sometimes more violent every other day, giving to the case the character of a double tertian.

II. Tendencies and Terminations.—1. Mild attacks, in persons of good constitution, even when but little is done to moderate their violence,

will, in many cases, terminate by a sort of crisis at some period of the second week, and recovery or a regular intermittent follow.

2. In more violent attacks, it may soon be discovered that some organ is becoming inflamed. The one which is, perhaps, more frequently attacked than any other, is the spleen; but that organ does not always make known its condition; next to it, in the opinion of many, is the liver, of which the inflammation is less obscure in its signs; then come the stomach and duodenum; then the head, and lastly, the lungs. In proportion to the intensity of the inflammation thus awakened, is the danger of the case; and those who perish within the second week, generally die of inflammation of some great organ.

3. Passing beyond the period here mentioned, the disease may lose its acuteness and periodicity, and begin to exhibit typhous symptoms, which may gradually increase, until a fatal termination occurs at the end of two, three, or four weeks. In this condition a close diagnostic inspection will generally discover some organ in a state of subacute inflammation, and the one, perhaps, the most frequently involved is the brain; but more of this hereafter.

4. In some cases, especially in the South, it is observed, that after a few regular paroxysms, the hands and feet will continue cold through the hot stage, and only recover their heat in the remission; and this, with other symptoms to be mentioned elsewhere, indicate to the experienced observer, congestion of some of the great organs, continuing throughout the whole twenty-four hours, and admonishes him, that he has to deal with a lurking malignancy.

5. Far in the North, remittent fever often presents, almost from the beginning, a tendency to the continued type, displaying the characteristics of the synochus of Cullen's Nosology. It is properly called autumnal fever, because it prevails most in that season, and is an equivalent for the true remittent fever of the warmer climates. Nearly the same remark is applicable to this fever, when in the middle latitudes it appears in the long-cultivated and drier portions of Tennessee, Kentucky, Western Pennsylvania, and Ohio. Formerly it often abated into an intermittent; latterly, it is apt to degenerate into a continued type.

6. All these tendencies and modes of termination may occur in the same locality, and in the same autumn; but some are more common in one place, others in another. Moreover, in one season, the case may be generally mild and simple; in another, highly inflammatory; in another, disposed to assume a typhous character; in another, a malignant or congestive type.

SECTION II.

TREATMENT.

THE concise history of the symptoms and pathology of simple and inflammatory remittent fever, which I have sketched belongs to the middle latitudes rather than the northern; where, as we have seen, the tendency to a continued form prevails; or the southern, where the malignant or congestive type most frequently manifests itself. And what I am about to say on the treatment, will apply more aptly to the fever of our temperate climates than any others.

I propose to speak successively, of the various methods of cure which have been in vogue among us; and as far as possible assign the principle on which each was based:—

A reference to the times of settlement of the Interior Valley (*Vol. I. Book I. Part III.*) will show that, with the exception of the French and Spanish inhabitants around the Gulf of Mexico, and the French and British on the St. Lawrence and the Lakes, nearly all the settlements of the Valley have been made within the present century; it is possible, therefore, to review the plan of treatment from the commencement of western society, which cannot be done in any other part of the world where larger masses of population exist.

I. FIRST TREATMENT IN THE WEST.—There has never been a time when our fever was regarded and treated, as a simple inflammatory affection —a mere phlegmasia. In the earliest period of immigration, it was believed to have something in its pathology, which required other agencies than the antiphlogistic, although a portion of that treatment might be requisite. Two facts, especially fixed the attention of the physicians of that day: *First.* The derangement of the biliary function: *Second.* The inherent periodicity of the Fever; and these facts suggested the treatment. The disordered functional action of the liver was to be corrected; the stomach and bowels relieved from their morbid secretions; the arterial excitement reduced until intermissions were obtained; and then, the bark was to be administered to prevent the recurrence of the paroxysms, and complete the cure.

For the accomplishment of these ends, the lancet was employed in the more violent cases, especially when signs of inflammation in any organ were present; and blood was drawn several times in certain cases by some physicians. Others, however, scarcely employed the lancet in any; and referring to the admitted fact, that the drawn blood was, in most cases, free from buff, they argued that venesection could do no good, and might do harm, by inducing the typhous state.

Emetics in those days were standing remedies in this fever. The patient

generally threw up a liberal quantity of bile, and felt more comfortable after the operation. In many cases they were repeated several times.

Cathartics were in equal, or in even greater use, and consisted chiefly of calomel and jalap, or of calomel followed by castor oil, Glauber's salt (*sulphate of soda*), or an infusion of senna sweetened with manna. A close inspection of the discharges from the stomach and bowels was regarded as an indispensable duty at every visit; and the slightest indication of a return to a healthier state of the secretions, was seen with hope and satisfaction.

Tartarized antimony, generally used as an emetic, and often combined with a cathartic medicine, was also administered in nauseating doses; sometimes in simple solution, but oftener in combination with saline refrigerants, of which the most reliable were the nitrate of potash, and the acetate of potash, or common saline mixture, formed with sub-carbonate of potash and diluted vinegar, sometimes administered in a state of effervescence. The spirit of nitrous ether was likewise in universal use, and often added to the saline draught. But, Professor Rush, who controlled the medical mind of the whole country more than any other physician has since controlled it, proposed the following receipt, which was almost universally adopted:—

R.—Nitrate of Potash, - - - - - - - ʒj.
Tartarized Antimony, - - - - - - gr. i.
Calomel, - - - - - - - - - - grs. vj.
Triturate together, and divide into six papers.

One of these powders was given every two hours, through the hot stage. They always nauseated, and sometimes produced both vomiting and purging, while the nitre acted as a refrigerant and sedative.

If the calomel thus or otherwise administered, affected the mouth, no regret was felt by the physician, for, in fact, a mercurial action was thought to be curative. It was generally held, that calomel, on the whole, was the most important remedy, inasmuch as it would act on the liver (assumed to be the organ primarily affected), and at the same time arrest the fever, by its influence on the constitution. With these satisfactory reasons for its administration, it was generally continued for such a length of time, that but few patients got through an attack of the Fever without a salivation.

Opium, in connexion with sudorifics, was in general use, and after free evacuation from the bowels, through the afternoon and evening, Dover's powder, or the spiritus Mindereri with paregoric, was administered to produce sleep and diaphoresis through the night.

Cupping was seldom practised, and leeching nearly unknown. But instead of these, blisters were employed, not only to relieve local inflammation, but to subdue the Fever, when no sign of inflammation existed; and, hence, almost every patient had a blistered surface on some part of his body, throughout the whole period of his confinement.

The object of all this treatment, was to prepare the system for the recep-

tion of the bark and other tonics. The length of time required to effect what was regarded as the necessary preparation, varied in different cases, but was scarcely ever less than a week. In many respects this method was judicious; and, although I have spoken in the past tense, it still maintains itself (with some modifications), in the confidence of a large portion of our physicians.

II. ADVANTAGES AND DISADVANTAGES OF THIS TREATMENT.—The indications proposed to be fulfilled by this treatment, were, in the main, correct; but some received too much, others too little attention, and a part of the means employed acted violently on the system, without superseding the morbid action.

Those who regarded the Fever as arising independently of inflammation, often omitted bloodletting; when, even in the absence of inflammation, there were reasons for employing it; and, on the other hand, they who held to the inflammatory origin of the Fever, placed too much reliance on that remedy. The *true* reason for resorting to the lancet was not perceived; but on this point I shall speak presently.

The exhibition of powerful emetics and cathartics, *before* resorting to the lancet, was wrong, for they would not operate kindly, and their daily repetition sometimes produced gastro-enteritis. The signs for their discontinuance, were a healthier aspect of the tongue, and of the alvine discharges; but, how could they assume a natural appearance, under the daily irritation of drastic medicines? Too much stress was, in fact, laid upon the indication—"to correct the state of the secretions." Moreover, many physicians prescribed purging for the purpose of lowering the excitement of the vascular system, when venesection would have accomplished that object much better, and without the risk of exciting mucous irritation in the stomach and bowels.

As calomel is, perhaps, the most efficacious of all antiphlogistic alterants, and, as the liver seemed to be more involved than any other organ, it was not strange, that physicians should have assumed, that a mercurial action would supersede the Fever; and, therefore, should have administered that medicine both liberally and perseveringly. The curative results of this practice were seldom satisfactory, however; while its pernicious effects were sometimes of the saddest character.

The extensive blistering which made a part of that treatment, was every way objectionable. It was sometimes resorted to, while the arterial excitement was high, when all the effects obtained, were an increase of that excitement; and an extensively ulcerated surface, which added to the sufferings of the patient, and occasionally became gangrenous.

Lastly, the administration of the bark was deferred too long; though, we must admit, that it cannot be safely administered, at as early a period of the Fever, as the sulphate of quinine.

We come now to speak of curative plans, carved, as it were, out of that

which has been discussed. Methods founded respectively, on a single idea; and therefore, commended to us by their simplicity.

III. Treatment as for Gastro-enteritis.—The fascinating simplifications of Broussais, could not fail to meet with advocates among us; but they have never amounted to more than a respectable minority. The assumption, that remittent autumnal fever is but a primary gastro-enteritis, had the appearance of a pathological discovery; and the proposed treatment was acceptable to all, both physicians and patients, who had become tired of the polypharmacy, and the uncertain results, of the prevailing method. To withhold emetics and cathartics, opium, stimulants, and food; to give demulcent and acidulated drinks; to use the lancet in some cases, and cup or leech the epigastrium in all, was at once easy in practice, and captivating in promise. In cases which were, really, attended with mucous inflammation, this method was beneficial; and its adoption by a number of our physicians, exerted a salutary influence on the rest, by restraining them from the *excessive* administration of tartar emetic, calomel, and drastic cathartics. Without having, therefore, superseded, it has modified the older method. Two or three things have, perhaps, contributed to limit its more general adoption. *First.* The extreme difficulty of adequate, topical bleeding, in the country, to which most cases of the Fever belong. *Second.* The desire of our people for strong measures. *Third.* The general propensity in our physicians to employ them; that is, to be doing a great deal.

IV. The Purging Practice.—At all times, and with all our physicians (except those who adopted the opinions of Broussais), purging, as we have seen, has been an important part of our *methodus medendi;* but it required a peculiar hypothesis, to resolve the *whole* treatment into that operation. This was at length supplied, in congestion of the portal circle and the vena cava ascendens. The removal of this congestion constituted the sole indication of cure, and was to be accomplished, by increasing secretion from the liver and the mucous membrane of the stomach and bowels. Those who adopted this hypothesis, as simple as the gastro-enteritis of the French school (but suggesting, in the opinion of its advocates, a totally different practice), built their hopes on drastic purging, and consistently, made calomel the governing article of their prescriptions. Thus the mercurial and cathartic treatment became united into one method, which in its application substituted for the discriminating skill of the physician, the relentless punctuality of the apothecary and the nurse. Calomel, in doses which the world had not hitherto known, was given to excite the liver and mucous membrane into increased secretion, and drastics, in corresponding doses, to drain the bowels, as fast those fluids were poured into them. The object was not to supersede the febrile action, by a mercurial irritation of the general system; but to rouse the liver and gastro-enteric membrane into secretory excitement; and thus transform the blood of the portal viscera into bile and liquor-intestinalis. To this end, scruple doses of calomel were regarded as

sufficient for the mildest cases only; and drachm doses, at short intervals became a familiar prescription, in ordinary epidemics; while, in those of greater violence, portions of half an ounce, an ounce, or an ounce and a half, were swallowed by the patient several times a day; till in some instances, a pound or a pound and a half was administered to a single patient, and gave to his excretions the appearance of chalk! I am not at liberty to doubt the testimony collected in the South, on which I make this statement. In the State of Mississippi, a physician assured me that he had given a patient, one thousand grains for three successive days! As the purgative effects of calomel do not increase with the dose, and yet purging was an essential part of the cure, medicines better calculated to excite it, were either alternated or combined with the calomel; and these were very commonly given in vast doses. A respectable planter in the same state, assured me that he had given, by order of his physician, such quantities as I thought incredible; till I met with a neighboring physician, who declared that he had administered, in a single case, six hundred grains of a triple compound of aloes, rhubarb, and calomel in equal quantities, for six consecutive days! Such instances, I am happy to think, embrace the extreme abuses of this method; and the number who reached these criminal limits, was perhaps not very great. It cannot be denied, however, that the practice, here reprobated, was for several years that on which numerous physicians of the West and South rested their hopes; and although in general they stopped short of the recklessness of a few, they carried their single idea to an excess, which at length produced a revulsion in the public mind, and in numerous instances led to their being superseded by empirics, who declaimed equally against the judicious and headlong administration of calomel. Under this reaction, it became at last difficult to exhibit that medicine in any dose, and the blue pill is now often substituted, when calomel would be preferable.

It does not appear, I think, that the immense doses of calomel, administered by a few fanatics, did any more injury, than the drachm doses of the majority of physicians. These doses often passed through the bowels undissolved, and inactive. They did not salivate or purge more than the smaller portions. They were, however, a revolting absurdity. The drastic purging to which the patients, day after day, were subjected, was no doubt as pernicious, though not so frightful to the people, as the mercurial ravages, which in many instances accompanied this practice. The former were invisible, the latter visible, to the public eye. That the purging practice was often contraindicated by, or produced inflammation of, the mucous membrane, no sound pathologist can doubt; and therein consists one of the weightiest objections to the practice. Another is, that in cases which had any latent tendency to those paroxysms of collapse, which are called malignant or congestive, excessive purging soon developed it, so that it has grown into a saying in many parts of the South, that congestive fevers are made by this practice. Further north, the same purging, has often led to the production

of a typhous state, equally, though not so immediately dangerous. Finally, both this and the practice of the Broussais school, are liable to the grave objection, that they aspired to be curative, when, in their most judicious application, they were but preparative.

Having given this brief narrative of the methods of treatment, which have prevailed, and indeed still prevail among us, I proceed to speak of that to which public opinion has for some years been tending, and which seems to me preferable to any which has yet been followed.

V. Tendency at the Present Time.—Both the methods of treatment we have just discussed, are modifications of the first, and that which we are now to study, can claim nothing more. Its fundamental principles are, that autumnal fever is the product of a specific cause, and, therefore, consists in a morbid action of a peculiar kind, requiring a specific remedy; that we possess such an antidote for the intermittent variety of the Fever; and, that, we have only to abate all the causes and points of difference between the two varieties, to render the sulphate of quinine as efficacious in one as the other.

But what *are* the pathological differences between them? The answer must be, that we do not find them, in the functional disturbances and morbid secretions of the liver and *primæ viæ*, which are generally as great in the intermittent as the remittent type. They seem to me to consist in a higher febrile excitement of the whole system; a greater tendency to visceral hyperæmias and inflammations; a much longer hot stage; and the consequent want of a complete intermission. These conditions being obviated, the antidote will take effect, as in an ordinary intermittent. The old treatment, it is true, proposed all this; but the change in the condition of the system was to be accomplished gradually; and as each exacerbation of the Fever, added to the lesions of innervation, or renewed the inflammation of some organ, it often happened, that a suitable condition for the administration of the antidote was never reached.

The new modification of treatment, consists in transforming a remittent into an intermittent in a single day, and by a single agent. As stimulation will raise an intermittent into a remittent, so an opposite treatment may suddenly change the latter into the former; or, at least, so reduce the excitement of the heart and arteries, that the pathological state of the patient is an equivalent for the apyrexia of an intermittent.

Bloodletting is the means for accomplishing this end. To be successful, however, it must be employed in the first, second, or third paroxysm, that is, before inflammation in any organ has become established. The quantity taken, must be such as will bring the patient to the verge of syncope. Pallor and perspiration of the face, yawning, nausea, and a feeble, empty, and rapid pulse, must declare, that the excessive excitement of the system is, for the time being, effectually brought down. If these effects be not

produced, the preparation of the system for the antiperiodic is not accomplished.

After such a bleeding, we may or may not administer an evacuant; but if decided on, it should be given *without delay*. In the higher latitudes, ten grains of calomel, ten of jalap, and one of tartar emetic, mixed, or a solution of the last, with sulphate of magnesia, may be administered. To the south, two or four grains of ipecac may be combined with ten or fifteen of calomel, and, in a few hours, worked off with castor oil, and oil of turpentine, mixed, or an infusion of senna and manna. By the sudden and profuse evacuation thus effected, the condition of the system, produced by the bleeding, will be augmented, and the *primæ viæ* prepared for the reception of the antidote. But if the signs of gastric and biliary disorder should not be great—if the stomach has not been previously irritable, nor the bowels obstinately costive, nor the eyes and skin tinged with bile—the cathartic may be omitted.

Having thus lessened the volume of blood, reduced the power of the heart, and increased the susceptibility of the system; having, in other words, brought about a transient, artificial intermission, the sulphate of quinine, as the specific alterant, must be immediately and liberally administered. If it be deferred, another paroxysm will form; just as we see the fever in scarlatina or small-pox return, after bleeding, even to *deliquium animi*. Those diseases, respectively, depending on specific causes, will not yield to a simple antiphlogistic treatment; in like manner, the Fever we are now studying depends on a specific cause, and demands for its cure something that can supersede the morbid action. To this end, ten grains of the sulphate of quinine, with one or two of opium; and, if no calomel have been given, ten grains of that medicine, should be exhibited in a single dose. The results which may be expected are sleep and perspiration, with a full, slow, and soft pulse. In the latter part of the following night, the dose of quinine must be repeated, with or without the other medicines, and again repeated about noon the next day. It does not follow that the patient will not, at that time, have some degree of thirst, pain in the head or back, and increase of pulse; but his warm perspiration will continue. In this exacerbation, an injection may be administered, if he had not been previously purged, or he may be bled again. At bed-time, a fourth dose of the quinine, with an equal quantity of Dover's powder, should be taken, and another portion of quinine should be exhibited early the next morning. If he had not been freely purged at the beginning, he may now take a stimulating cathartic; but, if possible, should use the pan, and not leave his bed during the operation. In the early part of the following night, he must repeat the quinine and Dover's powder, after which a repetition will scarcely be required. He ought, however, to keep in bed for two or three days longer; a gentle diaphoresis should be kept up, and the healthy action of the liver restored, by small doses of the blue pill and quinine, with a gentle opiate at night.

In principle, this method is the same which we find successful in pneumonia, hepatitis, and some other phlegmasiæ, except that the alterant used is different. In pneumonia we do many things, but the detraction of a great quantity of blood, followed by the immediate administration of large doses of tartar emetic, will effect a cure; in acute hepatitis a similar bleeding, succeeded by full doses of calomel, will bring out the desired result. The same is true of acute peritonitis, which, readily yielding to these measures, proves fatal without them, notwithstanding many other things may be done. In these phlogistic fevers, tartar emetic and calomel, respectively, exert an alterant influence, which, without the previous bleeding, they could not. *They* have power over *common* phlegmasial fever and inflammation; but not over the *specific* fever, and its associated inflammations, which constitute the disease we are now studying. To supersede *them*, we must establish in the system (rendered unresisting by the loss of blood), an action incompatible with the febrile and inflammatory—a transient quinine disease, which, ceasing spontaneously, leaves the patient free from his original disorder.

But this happy result is not always attainable, and we must now consider the causes of failure. I have limited the commencement of the proposed treatment to the third paroxysm; but there may be cases in which it will succeed, if begun in the fourth or fifth; nevertheless, the earlier, the better; for, if inflammation have become *established* in any organ, it may not yield to bloodletting, the quinine, or any other means. Moreover, the longer the fever has continued, the less is the quantity of blood which can be taken away with impunity. The vital energies have begun to fail; the susceptibilities have become more perverted, and the blood has fallen into a vitiated condition. Under these circumstances, if a free bleeding should be practiced, a dangerous constitutional irritation may follow; for copious venesection renders the heart and arterial system irritable; and thus gives to the deteriorated blood, a reactive influence upon them, which, before the operation, it could not exert. The practice of bleeding to relieve inflammation, in an advanced stage of the Fever, has been condemned, even by those who bleed freely in the beginning. But may not an immediate exhibition of quinine obviate the objection to such a bleeding? May not that medicine, even, contribute to the cure of the inflammation? Is not the inflammation as much a part of the Fever, as the pustule is of variola, a quinsy of scarlatina, or the abscess of a lymphatic ganglion, of the chronic fever, present in some cases of scrofula? These questions must be answered, I think, in the affirmative; and, if so, we might expect advantages from the quinine in remittent fever, even when inflammation exists. If, however, it should not possess a power of that kind, it would not, I suppose, increase the inflammation; while its peculiar sedative and semi-narcotic operation, would aid in repressing the constitutional irritation, which might follow bleeding in the stage of the Fever, we are now considering.

Although inflammation is not the cause, but arises with, or supervenes upon, remittent fever, still, it is not on that account the less dangerous. When it begins with fever, it generally yields to a copious bleeding, and the subsequent use of quinine; but when its development is late, it often sets our utmost efforts at defiance. Among the means which may be employed for its abatement, there are three external applications, in which considerable confidence may be placed: *First.* Long-continued tepid ablutions and fomentations over the affected organ. *Second.* Repeated topical bleeding. *Third.* Blistering, which, however useless when there is no inflammation, is of much value when that condition exists. There are, moreover, several medicines, which may be employed with advantage. Thus, if the inflammation be seated in the liver or spleen, calomel should be administered in doses of four or six grains, every two or four hours, according to the violence of the symptoms; if seated in the mucous membrane of the stomach and duodenum, the same medicine, triturated with gum arabic, refined sugar, and opium, or the sulphate of morphine, should be employed; if the lungs be the seat of the inflammation, tartarized antimony, and other sedative expectorants may be used; if the brain, calomel with cathartics, will be proper.

Should any one of these inflammations become intense, the fever may assume a continued type; when quinine would, perhaps, prove useless; but, if remissions still manifest themselves, that medicine should be mingled or alternated, with the other means which have been recommended.

VI. FACTS BEARING FAVORABLY ON THE EARLY EXHIBITION OF QUININE.—The treatment recommended under the last head, is one which I have pursued, as occasional opportunities offered, since the year 1838 or 1839. The effects have been highly encouraging, but I am not under the necessity of commending it on such limited grounds, for in several long journeys, from 1840 to 1844, I collected the experience of a multitude of physicians, from the Gulf of Mexico to Lake Superior, and will present an abstract of that portion which is in favor of the early administration of quinine.

At Milwaukie, N. L. 43°, remittent fever is almost unknown; but Doctor Hewet, had treated cases successfully on the old method of venesection (in some cases), emetics, cathartics, and diaphoretics, for a week, when he administered the sulphate of quinine.

The Fever is somewhat more prevalent at Racine, a little further south; the treatment, as I learned from Doctor Blanchard, and Doctor Graves, the same as that just mentioned.

Chicago, still further south, on the same western coast of Lake Michigan, is far more infested with the Fever. Its treatment, as stated by Doctor Brainard, Doctor Brinckerhoff, and Doctor Kimberly, is substantially the same as at the two other towns.

At Port Huron, N. L. 43°, the Fever is frequently epidemic. Doctor

Noble informed me that he seldom bleeds; but after the operation of an emetic or mercurial cathartic, administers Dover's powder and camphor, till an intermission with perspiration is obtained, when he resorts to quinine.

At Detroit, Doctor Potter regards bloodletting as a most important remedy. Doctor Pitcher, a gentleman of ripe experience, resorts to the lancet early, gives a cathartic of calomel, and then administers quinine, in five or ten grain doses.

Doctor Denton, of Ann Arbor, west of Detroit, is a strong advocate for bloodletting; to which he resorts in the cold stage, rather than the hot, and sometimes bleeds twice in one paroxysm; but does not administer quinine, till after a lapse of six or seven days.

Doctor Landon, of Monroe, south of Detroit, has bled freely, and saw the blood sizy; then purged copiously, and proceeded to the administration of quinine; which he has often given with success, when the tongue was still heavily coated.

The estuary of the Maumee, at the southwest angle of Lake Erie, is infested ith this fever. Doctor St. Clair bleeds freely, and has often seen the blood sizy; uses emetics, and cathartics; but does not begin to employ the quinine for several days afterward.

Doctor Peck bleeds, vomits with tartar emetic, and purges with calomel and other cathartics, till an intermission is obtained. In this condition, when the tongue has become clean, and the patient seemed convalescent, the next paroxysm has set in with coma, and that which followed proved fatal. In other cases, this sinister effect has been averted by five grain doses of quinine, in conjunction with the same quantity of calomel.

Doctor Dwight has in some autumns, bled freely, and seen the blood buffy, purged with calomel, and then administered quinine.

Doctor Van Every, in the autumn of 1838, bled in almost every case, sometimes to twenty ounces—after which, cathartic medicines operated freely, when he gave three grains of quinine every two hours.

Doctors Smith and Perkins did not bleed very often, but found the early use of quinine, in two-grain doses, every two hours, successful.

In the same fever, Doctor Ackly gave the blue mass, of calomel with morphine and ipecac, or tartar emetic every three or four hours, till a diaphoresis occurred; when he administered a cathartic, and then resorted to quinine. All these observations were made in the same region.

Doctor Cochran of Sandusky City, south side of Lake Erie, has bled freely, given a few large doses of calomel, and then administered ten grains of quinine every eight hours, till perspiration came on.

Doctor Tilden, of the same city, has seen bleeding, vomiting, and purging, do harm, when not followed by an early administration of quinine.

At Norwalk, near Sandusky, Doctors Baker and Kitteridge, have bled, in some cases several times, and found the blood sizy; administered calomel freely, purged with extract scammony and colocynth, followed with castor

oil, and as soon as the remissions were made a little more perfect, administered quinine.

Doctors Manter and Howard, of Elyria, on the same lake-terrace with Norwalk, have found quinine injurious in the Fever, before it was brought, by one or more bleedings, to an intermittent type. Have often seen the blood sizy.

Doctor Wallace of Massillon, Ohio, bleeds freely, once or twice, and, without waiting for an intermission, proceeds to give quinine in five-grain doses.

At Joliet, on the Illinois River, Doctor Scholfield informed me that he was in the habit of giving his patient from twenty to forty grains of calomel, with half a grain of sulphate of morphine, while in the exacerbation, and followed it the next day with castor oil or salts, immediately after which he administered the quinine.

Doctor Howland, of Ottawa, on the same river, bleeds, and if the patient have been costive, gives a cathartic of blue pill and rhubarb; otherwise he proceeds at once to administer quinine.

Doctor Whitehead, of Lasalle, on the same river, in an epidemic remittent, omitted bleeding, administered a dose of calomel and pulvis antimonialis, as a cathartic, and then gave quinine in two or three grain doses, sometimes combined with Dover's powder, every two or three hours. It arrested the hot stage, and brought on perspiration, with a slow and full pulse.

In Springfield, the capital of Illinois, I found Doctors Todd, Henry, Jayne, Merriman, and Frazier, concurring in the practice of very moderate preparatory evacuation, either from the bloodvessels, or the bowels, and an early administration of quinine and opium.

At Jefferson City, on the Missouri River, Doctors Abbott and Edwards, in the declining stage of the first paroxysm, without any previous preparation of the system, begin the administration of quinine in two or three grain doses, at short intervals, till the paroxysms cease to recur, when they give a mild cathartic. When the fever is strongly remittent, they bleed before using the quinine.

Doctor Price, of Arrow Rock, further up the Missouri River, is accustomed to resort to quinine after the operation of a single cathartic or emetico-cathartic, notwithstanding there may be head or back ache.

Doctor Vaughan, of Dover, near the same river, does not often use the lancet, nor administer evacuants, but begins the treatment with quinine and calomel.

Doctors Shanks and Frazier, of Memphis, Tennessee, are accustomed to employ the lancet, cold to the head, some small doses of calomel and ipecac, and then, at an early period, to complete the cure with quinine. Doctor Christian, of the same city, in latter years, bleeds once, gives a few doses of spirit of nitrous ether, and then the quinine; in six or eight hours, a gentle cathartic, and quinine again; which method cures in one-third the time of that

which he formerly pursued. Doctor Grant, of the same city, formerly of the hill country, in Alabama, while there, bled freely, cupped, blistered when the stomach was irritable, gave a full dose of calomel, and in the first remission afterward, gave twenty grains of quinine in a solution of tartaric acid. A slow and full pulse, with perspiration, followed.

Doctor Hicks, of Vicksburg, Mississippi, after one bleeding, and a dose of calomel, or blue pill, with ipecac, administers quinine with happy results.

Doctor Gist, and Doctor Cabannis, of Jackson, Mississippi, purge moderately, in most cases with castor oil, and, in the first remission, give quinine, which they think tends to promote intermissions. In some cases they bleed.

Doctor B. Yandell, of Benton, Mississippi, often employs the lancet, and begins the exhibition of quinine before the end of the paroxysm.

Doctor Davis, of Natchez, bleeds, and resorts almost immediately to that medicine. It abates the thirst, and the force and frequency of the pulse, increases its fulness, and promotes perspiration. In the cases in which it fails to produce these effects, he throws it aside. Doctor Jones, of the same city, seldom bleeds, but after the operation of a dose of calomel, or blue mass, followed by castor oil, proceeds to administer the quinine, in five-grain doses, every three or four hours.

Doctors Tate, Estes, and Winter, of Columbus, Mississippi, have found that many cases of remittent fever, treated only with aperients, and cold acidulated drinks, assume an intermittent type, and are cured with the quinine. These physicians, with their brethren, Doctors Smith, Jones, Lipscomb, and the Malones, have found the lancet unnecessary, or injurious, and drastic purgatives still more so. After gentle alvine evacuations, they depend on quinine.

Doctors Beall, McCune, and Wilkins, of Pickensville, Alabama, on the Tombeckbee River, below Columbus, condemn free purging, and do not employ the lancet, without following it immediately with quinine.

Doctor Drish, of Tuscaloosa, in the same state, frequently bleeds, sometimes vomits, purges with calomel, or the blue mass, combined with opium, and then gives one or two grains of quinine, with piperine or morphine, every hour or two. He has seen large doses of calomel produce watery discharges.

Doctor Billingslea, on the Tallapoosa River, has used large doses of quinine immediately after bloodletting.

Doctor Echols, of Selma, bleeds, but generally omits active purging, and proceeds to administer quinine.

Doctor English, of Cahawba, bleeds, cups, administers a mild cathartic, and then gives quinine.

Doctor Hogan, of the same region of country, as his partner, Doctor Stone, informed me, stimulates, and administers quinine from the beginning, with admirable success.

When at Natchez, in 1844, I was told by Doctor Cartwright, that Mr.

Charles Crossgrove, a respectable superintendent of a cotton plantation, in Concordia Parish, Louisiana, had administered quinine with great success. I had a conversation with him on the subject, and, he, also, gave me a written statement, of which the following is the substance:

On the plantation there are fifty-five negroes, and a white family. No physician had been employed for three years. Autumnal fever, in its different varieties, had been the chief disease. He began the administration of quinine without any previous evacuation. The first day, he gave two doses, of ten grains each; the next day, three doses, of the same size. He never had occasion to administer the medicine beyond the third day, and it had never failed, in a single case, to "break the fever." It is worthy of remark, that, on the plantations of the South, the treatment is begun with the beginning of the Fever, before deep-seated congestions or inflammations have been formed.

Finally, I may add, that, when exploring the statistics of the great Charity Hospital of New Orleans, in 1844, I found that a change had taken place in the method of treating patients there, as great as I have found over the country at large. The mercurial and drastic practice had given way to mild aperients, occasional bloodletting, and an *early* exhibition of quinine; the effect of which had been a diminution in the number of deaths, compared with the number of cases admitted into the hospital.

These citations show that, in all parts of the Interior Valley, there are physicians who, for several years past, have been changing their modes of practice in the *same* direction; and that, too, without borrowing from one another. The reform may be said to have arisen spontaneously in each portion of the country; and is, therefore, entitled to the greater confidence. The facts which I have presented were collected from 1840 to 1844, inclusive, and, at the end of the latter year, transcribed and arranged. During that period, and since, more has been published on the treatment of the Fever, than for a long time before; and almost every paper testifies to what I am attempting to establish. But I do not think it necessary to make a transcript of this published experience, as it is within the reach of our physicians, and does not materially extend our knowledge on this point, beyond the unpublished notes which have just been presented, however strongly it may confirm the conclusions to be drawn from them.*

It may be said that I have given the evidence on one side only. This I grant, but I know of none on the other. All our physicians are advocates of the quinine-practice; and even those who postpone the administration of the antiperiodic to a later stage of the Fever, and subject their patients to a longer preparatory treatment, do not, in general, profess to have given the

* The papers to which I allude, may be chiefly found in the American Journal of the Medical Sciences, and in the Journals of New Orleans, St. Louis, Louisville, Cincinnati, and Buffalo. Several of them are from gentlemen whose names are in the foregoing catalogue of authorities. Of those with whom I had not the opportunity of conversing, I may mention Dr. McCormick, and Dr. Porter, U.S.A., whose observations in Florida, confirm, in the amplest manner, all that has been said.

method here recommended, a trial, and rejected it as injurious or ineffectual. They are only more conservative than their brethren—more attached to old ways—and yet, even the most cautious among them have abated considerably in their diversified, and often, perturbating measures.

VII. Required Modifications of Treatment.—1. *From the Epidemic Constitution.*—At different times our Valley has been visited by an epidemic constitution of the typhous kind. The effect of such an atmospheric influence, is to convert our remittent into a continued fever, or at least, to give it a set in that direction. This complication of two diatheses, greatly increases the difficulty of the treatment; for neither the copious detraction of blood, nor the liberal exhibition of quinine, is apt to prove beneficial in such cases. They are, in fact, exceedingly difficult to manage, and demand from us the most careful consideration; but what may be said, can be best introduced under the head of typhous fevers; where the treatment of the so-called "typhoid stage" of remittent fever will also be presented.

2. *From a Northern Climate.*—In the northern part of the Valley, where autumnal remittents often incline to a continued form, quinine is, perhaps, not as efficient; and is, certainly, not administered in as large doses as are given further south. Copious bleeding would, perhaps, increase the efficacy of that medicine in the higher latitudes, while it would, in turn, prevent any bad effects from the loss of blood.

3. *From a Southern Climate.*—The modification of the proposed treatment which is required in the South, relates chiefly to the use of the lancet. The heat and moisture of the southern climates, in connexion with the agent, whatever it may be, which occasions the Fever, so act upon the constitution, that acute inflammation, and a high phlogistic diathesis, are not easily induced; and copious venesection, as a preparative for the quinine, is not so necessary as in more northern latitudes. At the same time, that medicine seems to act more kindly, and to be borne in larger quantities in those climates, than further north; of which more will be said in the next chapter.

CHAPTER VIII.

MALIGNANT REMITTENT FEVER.

SECTION I.

GENERAL REMARKS.

The malignant remittent is the most dreaded form of our autumnal fever. Malignant intermittents, when left to take their course, will, it is true, ter-

minate in death; yet they are curable; but, under every known method of treatment, malignant remittents often prove fatal. I speak of cases to which the alarming epithet is truly applicable; and not of all which, in the loose phraseology of the people, or even of the profession, are *called* malignant. In the middle latitudes they are rare; and, although more frequent in the South, especially below the thirty-third parallel, they are nowhere as common as malignant intermittents. In some seasons, and in certain districts of country, they are more prevalent than in others. In the year 1843, I traversed, on different lines, a zone, extending from Arkansas to Florida, which is more infested with this fever than any other portion of the South. It lies chiefly between the thirty-first and thirty-third degrees, and includes what are called the prairies and canebrakes. The soil of those districts rests on cretaceous or "rotten" limestone. As every other form of autumnal fever prevails in the same zone, we are required to refer the whole to one remote cause; and confess our ignorance of the subordinate influences which generate the diversities which have been described.

I have conversed with many physicians, who had not recognised a remitting form of malignant autumnal fever. They spoke only of the intermitting. Others, however, had observed the distinction, and from them I collected facts, which, united with my own observations, give the following differential diagnosis.

SECTION II.

DIAGNOSIS AND PATHOLOGY.

I. THERE is no danger of confounding a case of malignant with one of simple or inflammatory remittent fever; for, in the former, certain symptoms which belong to the cold stage, continue in the hot, and even run through the remission.

1. The pulse does not rise in fulness and force during the exacerbation, as in the other forms of remitting fever, but remains undeveloped; being generally small, frequent, weak, and more or less variable. But when the remission begins, it generally improves in every quality; yet it does not become as healthy, as in the remission of a simple or inflammatory case.

2. The feeling of abdominal oppression, and the anxiety, restlessness, and gastric irritability, are deeper in this than in other forms of remittent fever; and these symptoms never cease entirely in the remission.

3. A coldness of the hands and feet, or of the ends of the toes and fingers only, continue through the hot stage, while the trunk of the body and the head are in high fever heat. With the arrival of the remission this coldness, in milder cases, is replaced by a natural temperature; but, in the more malignant, it continues, though, in general, with some abatement. Doctor

Pickett, of Mississippi, and many other experienced physicians, regard this, as the most characteristic sign of the form of fever we are now studying.

Malignant remittents may be distinguished from malignant intermittents; *First*, by presenting remissions only: *Second*, by showing less reduction of temperature: *Third*, by the comparative absence of cold sweats: *Fourth*, by more delirium, and less apoplectic drowsiness. With these exceptions, the description of malignant intermittents already given, answers very well for malignant remittents. In fact, the symptomatical diversity between them, is chiefly the difference between intermission and remission—between cessation and abatement. Yet, this difference is indicative of pathological modifications, which, from their obscurity and danger, demand a rigid investigation. In algid intermittents, the feeling of thoracic oppression, the dyspnœa, the thirst, and the icy coldness of the limbs, are either followed by death in a brief period of time, or they cease, and a comfortable intermission follows. In soporose intermittents, the apoplectic stupor ends in death, or the patient revives at the end of the paroxysm, and remains free, till the recurrence of the next. In both forms, there is such a complete suspension of morbid action—such a restoration of healthy function in the internal organs—that the patient seems almost free from disease, although the next paroxysm may prove fatal. He has neither fever, congestion, nor inflammation; but there is, in his system, a *disposition* to fall, again, into the pathological state of the preceding day; and the cure consists in changing or destroying this disposition, by the known antiperiodics.

Now, in malignant remittents, there is no time when the Fever is absent; and whatever irritations or congestions are formed in the cold stage—whatever inflammations are set up in the hot stage—remain, though moderated in degree, throughout the remission. Their continuance is, perhaps, at once the reason why intermissions do not take place; and the cause that this form of fever is not as curable as the intermittent. Whenever, in simple remittents, a complete intermission is effected, the antiperiodic puts an end to the disease, as certainly as if it had been, originally, of that type; and we may presume, that if a perfect apyrexia could be brought about in malignant remittents, they would be as easily cured as malignant intermittents. The task lies in effecting this transformation—in procuring this absolute intermission.

II. To reach a full apprehension of the difficulties in the way of this enterprise, it is necessary to inquire into the pathological conditions, which have to be overcome.

1. In every case there is an original morbid state of the innervation, which may be designated by the terms, prostration and irritation; and which, moreover, is peculiar or specific, febrile and periodical. To this affection of the solids, much of the feeling of exhaustion, the anxiety, the restlessness, and the suspended or morbid state of the secretions, is attributable. The same condition exists in intermittents, and is doubtless the

prove fatal, without the supervention of

riation of the solids, we must ascribe the
name to the cases we are now considering.
pathologists, have too often overlooked this
and found nothing to dread or avert, but
ave forgotten, that this unequal distribution of
altered condition of the apparatus of circulation;
gestion, the stronger is the evidence of a deeply
ming solids; and, consequently, the greater the
arrow down this theory, many of them regard the
ace chiefly in the great vessels, and in the cavities
alleged stagnant accumulations of the blood, they
But while we grant that the vena portæ, the vena
ricle and ventricle, are overcharged and embarrassed,
views beyond them.
under consideration, the blood, which, before the attack
gh the whole body, becomes largely accumulated in the
the subclavian and external iliac arteries, which, in health,
quantity, and carry it far away from the heart, to be slowly
receive very little; and an inordinate quantity takes the course
, and vertebrals, the intercostals, the bronchials, the coronaries,
mesenteries, and the emulgents, establishing a central or
in which all the cavities of the heart, the arteries, veins,
participate; by which the whole are oppressed and many
aggravations of these previously existing, are produced. I
, however, that the blood continues to circulate equally, and
gh all the organs; for it is seen discoverable that some are more
others; and they are, of course, the special seats of irrita-
gestion.
pathological condition, the secretions of the liver, stomach,
become highly morbid; and by their reaction upon the surfaces
are poured out, increase the very irritations, of which they
promote, thus augmenting the anguish, and the feeling of epi-
which are such prominent symptoms in every stage of the

the pathological conditions just described arise inflammations.
of the vital properties of the system in connexion with con-
speedily abstracted, carried on for a long while without originat-
we are not now particularly in the way of view,
fever are such as symptoms, which cannot be
on the theory of inflammation, to the unquestionable
effects of
With
added to the previous debility, irritation,

morbid secretion, and congestion, the complication is complete. Every element of difficulty and danger is present; and the concourse of symptoms displays, at once, a highly adynamic, and ataxic character. Should any one doubt the possibility of inflammation in one organ, while another remains in a state of passive congestion, and all are prostrated in their vital energies, let him contemplate for a moment, the phenomena which follow the escape of a portion of the contents of the bowels, into the sack of the peritoneum. Extreme prostration and irritation immediately ensue, and continue till the patient expires; before which event, however, the tenderness on pressure, the swelling, pain, and heat, clearly indicate a supervening peritonitis. The physician does not doubt its existence, notwithstanding the feeble and thready pulse, and resolves on venesection. When only four or five ounces of blood have been drawn, however, the patient faints, and no rise of the pulse, no reactive impulse of the heart, follow; yet, the blood is sizy, and a post-mortem inspection discloses active hyperæmias and effusions of coagulating lymph in the peritoneum, with passive congestions elsewhere.

Thus it is demonstrated that inflammation may be set up, when the power of the heart, and the tone of the arterial system, are in a state of extreme reduction; and, also, that it may continue until death, without arousing them into energetic reaction; which, no doubt, happens in the form of fever we are now studying.

Indeed, great energy in the heart is not necessary to the production of inflammation, which, being an affection of the capillary extremities of an artery, arises independently of the heart; and may, therefore, be as readily established in one condition of that organ as another. But the legitimate effect of any inflammation, is to rouse the central organ of the circulation into greater activity and stronger impulse. In a common phlegmasia, for example, this is done. In ordinary autumnal fever, of the kind denominated inflammatory, we observe the same effect; but, in the malignant variety, such a consequence may or may not result from inflammation. Hence comes the variety which has been observed in the movements of the heart; some physicians having observed them to be essentially feeble, others strong, but tumultuous, and inefficient in the propulsion of the blood to distant parts of the body.

In proportion as the inflamed organ is incapable of exciting the heart into vigorous, phlogistic action, the case is malignant; and the diathesis, which prevents that reactive influence on the central organ of the circulation, constitutes the true distinction between malignant and inflammatory remittents.

Neither the simple congestion, nor the inflammation which occurs in this fever, seems to have any special or invariable seat. There is no fixed law of localization, like that which determines the inflammation in variola upon the skin, or in scarlatina upon the throat; yet, as we shall see

hereafter, the abdominal organs suffer more than those of the other great cavities.

It is not likely that inflammation occurs in every case of malignant remittent; and if its ravages were found in all who die, they would only show that inflammation was probably the cause of death; while the patients in whom it did not occur, on that very account recovered.

Of the four pathological conditions—constitutional irritation, simple hyperæmia, morbid secretion, and inflammatory congestion, the first and last are most to be deprecated. When the first is so deep, that the excitement of the heart will not rise after bloodletting, or under the exciting influence of an inflamed organ, the prognosis is bad. On the other hand, whenever, from treatment, or the occurrence of inflammation, the heart rises in power, and the pulse becomes full and firm, the prognosis is better; for however intense the inflammation, it may be subdued or abated by treatment. Such a case presents the metamorphosis of a malignant into an inflammatory fever.

SECTION III.

TREATMENT.

I. Indications and Difficulties.—No physician enters on the treatment of a case of our malignant remittent fever, without a feeling of doubt as to the means, and of foreboding as to the result. To understand the sources of this misgiving, we must recapitulate the points set forth in the last section. *First.* There is a peculiar, original enfeeblement and irritation of the vital organs, the first effect of the remote cause. *Second.* This condition of the solids, occasions an internal accumulation of the blood, and passive congestions of some organ, or organs; which do not cease, but only suffer abatement in the remission. *Third.* In many cases, some of the congestions become inflammations. *Fourth.* Under the influence of one or more of these pathological states, the special functions of the organs are either suspended or increased, and at the same time perverted. In this morbid condition, the sulphate of quinine, as experience has shown, cannot exert the specific, alterant, and antiperiodic effect which follows its exhibition in the *apyrexia* of a malignant intermittent; and of course the first object should be to bring the system into a state favorable to the action of that medicine. The accomplishment of this end has taxed the ingenuity of our brethren, in regions where malignant remittents prevail; but no methods of practice have as yet given satisfactory results.

II. Venesection and Cupping.—When the lancet has been employed, the most opposite effects have followed. In some instances the pulse has sunk still lower, and the feelings of oppression and anxiety have increased. The physician has looked anxiously for reaction, and a more vigorous pulse,

In fact, cutaneous stimulation and bloodletting combined, are among our most powerful means of exciting reaction. But we too often apply our stimulants to parts which are benumbed and nearly insensible; when their effects are limited to drawing into the cutaneous capillaries a little of the stagnant blood, which still lingers in the muscles below. We see the redness, and suppose the organism at large must be acted on, when it is not. We deceive ourselves by supposing that derivation has been made from the affected organs, when it has only been made from the subjacent parts.

We make hot applications to the extremities, and when their temperature is raised with *transmitted* heat, we illogically and illusively regard the effect as identical with restored warmth from *developed* caloric—thus confounding a physical operation with a vital function—and are disappointed if the excitement of the heart and brain should not rise with the temperature of the heated limbs. If the same applications had been made to surfaces where the vital forces, the capillary circulation, and the calorific function were but little reduced, they would have acted with such energy as to carry an exciting influence into the central organs of innervation and circulation, when the loss of blood would have been better sustained.

But when no inflammation exists, the internal irritations and congestions are often relieved by these powerful revulsives; which, in fact, make a part of the treatment of all our physicians, however they may differ on other points of practice.

If I have not spoken of blisters, it was not because they are useless. For the purpose of exciting reaction, they are inferior to sinapisms; but, as means of revulsion, they are greatly to be prized. A large blister to the neck, when the brain is the seat of irritation or inflammation, is of much service; and, when the stomach and duodenum are specially affected, its influence is still greater; particularly if the surface be afterward covered, as I have already suggested, with a soothing, emollient poultice, which will promote a mild, suppurative inflammation of the skin, without pain or irritation.

And this leads me to say, that when our object in this fever, is not to excite the system, but to relieve the abdominal organs, from inflammation or severe irritation, it is decidedly advantageous to allay morbid sensibility with gentle narcotics, while our sinapisms or blisters are in action. If the patient be kept in a state of suffering by the external application—if he be restless and irritable—the revulsion will never be as favorable and effective as if he be kept composed. And to the administration of an opiate there can be no objection, since inflammation is the only prohibiting condition, and its grade is too low and irritative, to make it such, in the cases we are now considering; or, if it should be otherwise, if the inflammatory action should chance to run high, the lancet would prepare the way for the anodyne.

IV. External Emollients.—I have more than once referred to the

application of poultices to the irritated or inflamed skin. I come now to say, that when the brain is the seat of irritation or inflammation, the continued application of tepid water to the head, the hair having been shorn, is of much value; and, that for the relief of gastro-duodenal irritations or inflammations, it is, perhaps, still more valuable. A stream of tepid water cannot be made to fall for an hour on the epigastric and umbilical regions, without soothing the organs within. But, as inconveniences may attend that mode of application, the whole trunk of the body may be wrapped in a dripping-wet sheet, covered with any fabric that will confine the water, and thus keep the skin bathed in aqueous vapor of its own temperature. The revulsive and soothing effects of such an application are very great.

V. VOMITING.—As in malignant intermittents, so in the remittents we are now considering, antimonial emetics are inadmissible. Indeed, in the South, they are a generally admitted cause of the metamorphosis of simple into malignant remittents. They prostrate the general system still lower, generate gastric irritability, and excite serous diarrhœa. Yet vomiting is not always injurious. When the system is sunken and torpid, and passive congestions exist, a salt-and-mustard emetic often does good; but, in cases accompanied by, or tending to inflammation of the stomach or duodenum, with acrid secretions, the mustard is too stimulating, and the wine of ipecac, or a hot infusion of the *Eupatorium perfoliatum*, or of *Lobelia inflata*, should be chosen. Of the whole, the last is perhaps the best. While visiting the states of Alabama and Mississippi, in the year 1843, I learned, from many reliable persons, both in and out of the profession, that vomiting, with that medicine, had been found signally beneficial; and, in 1844, Doctor Monette, in a valuable paper on this form of fever,* bore unqualified testimony to its efficacy in the following language:—

"Emetics of the ordinary kind, that is of ipecacuanha or tartrate of antimony, the latter especially, are unsafe in most cases of congestive fever; unless the action and sensibility of the stomach have been previously excited by pepper and brandy, or some other pungent aromatic. Without a previous use of these precautionary measures, the ipecac or tartar emetic may prostrate without vomiting, or it may possibly pass off by the bowels, and produce hypercatharsis instead of emesis as desired. Yet there is a valuable article of the emetic class which is, at the same time, stimulant and emetic. This is the *Lobelia inflata*, which excites immediate vomiting, without any attendant prostration.

"This article, when properly used, is one of the most valuable emetics and stimulants in the materia medica, for the treatment of congestive fever. Its action is prompt, speedy, and easy, in the evacuation of the stomach, and in developing excitement. Nothing is more gentle, nothing more safe, nothing more salutary.

"There are cases, wherein it is desirable, after the excitement and reac-

* New Orleans Medical Journal, Vol. 1, No. III.

tion have been partially restored, to discharge the morbid secretions and ingesta, from the stomach, when they have become a source of morbid irritation. In such cases, to insure the prompt action of the emetic, the patient should first take a wine-glass full of warm toddy, with the addition of a few grains of capsicum to rouse action and sensibility in the stomach. A few minutes having elapsed, a full dose of fifteen or twenty grains of ipecacuanha, mixed in a wine-glass full of warm toddy, may be taken with great advantage. The operation is prompt, and instead of prostrating the patient, it excites the general action of the system, and promotes a salutary excitement in the stomach itself, and the collatitious viscera. Soon after free emesis has taken place, the system and the stomach specially, should be calmed and equalized by a gentle anodyne of morphia, or camphorated tincture of opium. A teaspoonful, or less, of the strong tincture of the seeds of the *Lobelia inflata*, will often be preferable to the ipecacuanha, as acting more promptly, and inducing less tendency to prostration."

The advice to administer a narcotic, after the operation of a vomit is highly judicious. Among other good effects which it may produce, is that of determining to the surface of the body; and, consequently, of making revulsion from the internal organs; to this end the vomit is an efficacious, predisposing remedy; for, as long as the stomach is oppressed or irritated by peccant matters, in any form of disease, perspiration cannot be excited. Moreover, vomiting at all times promotes that function.

VI. PURGING.—When congestion, either passive or inflammatory, occurs in the brain, cathartics are demanded; but the saline and hydragogue are not proper. Pills composed of equal parts of calomel, rhubarb, and compound extract of colocynth, make one of the best; and the first dose should be sufficient to effect a perfect evacuation. Should the cerebral disorder continue, the medicine may be repeated; unless a state of exhaustion should follow the first operation. The great object is to make revulsion from the brain; but this method may reduce the vital energies, faster than it diverts from the brain; and still further, it may establish a mucous irritation in the stomach and bowels, which in the end may prove dangerous. Notwithstanding the great efficacy, then, of purgation in ordinary apoplectic congestion, and in cerebritis from common causes, there is a narrow limit to its utility in the cerebral affections, which sometimes accompany our malignant remittents.

When the topical affections, or localizations of the Fever are found in the abdominal organs, a much greater abstinence from active cathartics is required. If the patient have been costive, a freer evacuation is necessary; but, even then the operation should not continue after the existing contents of the bowels have been removed; nor should the subsequent administrations have anything for their object, but the evacuation from time to time, of what may be poured into the bowels from their own mucous membrane, and the liver; the retention of which is always injurious. When diarrhœa is

present, a moderate cathartic, followed by opium and stimulants, may be safe, and productive of a quieter condition of the bowels. In all cases, however, hypercatharsis must be avoided as eminently pernicious.

Great care is necessary in the selection of cathartics. A portion of calomel—five, ten, or fifteen grains—worked off with a decoction of rhubarb, is proper; or the latter may be replaced with two drachms of castor oil, and one drachm of oil of turpentine, mixed; or with a powder of rhubarb and magnesia, should the previous discharges have evinced acidity. Another method of safe purging, in these cases, is to give pills composed of two grains of blue mass, two of rhubarb, and one of ipecac; which may be quickened in their operation by any of the mixtures just mentioned, or by the compound tincture of senna. Whatever medicines may be chosen, they should not be permitted to operate, on the same day, more than two or three times; and even a single copious evacuation will be sufficient; the object (properly) in view, being the evacuation—not the production—of morbid, secretions.

Such is the present state of medical practice, among the best observers, where malignant remittents most prevail; and it contrasts, strikingly, with the practice which it has superseded. Of the pernicious effects of incessant, and drastic purgation, I have already spoken, under the head of simple and inflammatory remittents; which were, sometimes, transformed by it, into violent gastro-enteritis; at other times, into still more dangerous malignant fevers. The pernicious effects of the practice were, however, incomparably greater in the form of fever we are now studying, than in the open inflammatory. Those who pursued the practice, saw in the cases before them nothing but an oppressive accumulation of blood in the abdominal organs—they had no end in view but its removal—they employed no means but those which would convert it into secreted fluids, and then evacuate them from the bowels. The certainty of increasing the debility of the patient was unheeded; and the danger of exciting or aggravating irritations and inflammations of the stomach and upper bowels, was overlooked. But apart from these serious objections to the practice, was it fitted to accomplish the end they had in view? It certainly was not; for purging, produces an introversion of the blood, the very condition for which it was prescribed. In the treatment of erysipelas, scarlatina, and other acute inflammations of the skin, the beneficial influence of cathartic medicine is produced by their diverting from the surface. On the same principle, after extensive burns or scalds, a favorable suppuration is prevented by purging, which reduces the cutaneous circulation. Finally, the free operation of a cathartic, when an individual is in health, never fails to produce a pallor, reduction of surface heat, and a shrunken aspect of the superficial parts of the body, showing a centripetal tendency of the blood; which of course, accumulates in the vessels of the interior. A therapeutic agency which produces such effects can never be adapted to the removal of the assumed abdominal con-

gestions, in malignant intermittent fever. The organs, it is true, may be depleted by the increased secretion; but the means employed, and the secretory actions which they excite, keep up the supplies of blood from the outer parts of the body, and thus maintain the congestion for the cure of which the drain was established.

VII. CALOMEL.—In the last chapter, an estimate was made, of the use of calomel in the treatment of simple and inflammatory remittent fever.

If we found, that too high a value had been placed upon it, in the treatment of those varieties, and that its liberal administration had often done harm; we may expect to find, that, in the cases we are now studying, it has, still oftener, disappointed the expectations of those by whom it has been prescribed; for it is unquestionably true, that it acts more kindly and efficiently in cases of an inflammatory character (after bloodletting) than in the adynamic and ataxic. The suspended, or morbid condition of the secretions of the liver, in connexion with epigastric tenderness and anxiety, so often present in this fever, suggested that calomel could not fail to prove salutary beyond every other remedy, and for many years it was administered in large quantities, especially in the South; but, in 1843, and 1844, I found that this practice had been generally renounced; yet the memory of its failures and ravages, had not faded from the minds of the profession, or the people. It was exhibited for the fulfilment of various speculative conditions as for exciting the liver into increased secretory action, that the portal circle might be relieved from congestion; for subduing gastro-duodenitis, extending into that organ, and for allaying simple irritation of the same parts.* The greater number had the first of these objects in view, and seemed to have lost sight of the fact, that the suspended or morbid action of the liver was secondary, and the consequence of a localization of the Fever, in the form of irritation or inflammation, upon the hepatic system; or if they admitted the existence of those pathological states, they assumed that calomel was the best means of curing them.

That moderate portions of that medicine, in connexion with other remedies, are useful, cannot be denied; but their exclusive and inordinate use is greatly to be deprecated. After local bleeding, and the evacuation of the existing contents of the *primæ viæ*, by the means just pointed out, the administration of three or five grain doses of calomel, in combination with small quantities of opium, morphine, or Dover's powder, and a free use of slightly acidulated demulcent drinks, with abdominal fomentations, are safe and beneficial. But, the epigastric irritation may be allayed, and the biliary secretion re-established by other means. Thus, Doctor Monette† declares,

* Some years before the visits of which I have spoken, a physician of Louisiana, flippantly and hyperbolically wrote me, that in a certain epidemic, he had drawn "blood enough to float, and give calomel enough to freight the steamboat General Jackson!" During my first visit, another, who had given it by the ton, said his object was, to *load down* the irritable stomach, so as to prevent vomiting! While others believed, that when they did not obtain bilious discharges, by ounce doses, it was because they were too timid in administration!

† New Orleans Journal, *loco citato*.

that since he has *discontinued* the exhibition of calomel his practice has been more successful than before. One of his formulæ for allaying gastro-duodenal irritation, is the following:—

℞.—Sulphate of Magnesia,	℥ij.
Ipecac,	grs. iii.
Tincture of Opium,	℥i.
Water,	℥vi.—Mix.

The dose is half an ounce every hour, or every two hours; according to the judgment of the physician in each case.

"This mixture, continued for twelve or fifteen hours, and sometimes, in less time, is followed by an abatement of the gastro-duodenal irritation, a general relaxation of the skin, and a full and soft pulse. Besides these salutary effects, a perseverance in the use of this mixture, for a longer time, is followed by a free and gentle discharge of *thick yellow bile*. During this administration, if the intestinal canal be in a high state of irritation from previous purgatives, or copious watery discharges, anodyne and emollient enemata are not to be neglected, nor demulcent drinks, of which none is superior to the mucilage made of the prickly pear by cold infusion."

Doctor Monette acknowledges himself indebted to Doctor McPheeters, one of the most sagacious practitioners of Mississippi, for a knowledge of the efficacy of sulphate of magnesia, in small quantities, with laudanum, in the irritations we are now considering. The addition of ipecac, made by himself, gives, according to his experience, additional efficacy to the prescription. When there is much developed fever, he adds to the mixture an ounce of spirit of nitrous ether.

"The proportions of each ingredient may be varied to suit peculiarity of cases. If the irritation was extreme, the first recipe was used; and the quantity of sulphate of magnesia diminished one half, and the tincture of opium increased in the same proportion. If the duodenal irritation was moderate, and the bowels appeared irritated with a profuse secretion of acrid bile, the quantity of sulphate of magnesia was increased; and sometimes the tincture of opium was diminished in the same proportion."

VIII. Refrigerants, Sedatives, Cholagogues, Diuretics, and Sudorifics.—I have joined these different heads together, because of their relations in practice. As long as the treatment of our malignant remittents was confided to unlimited doses of calomel, and unrelenting purgation, various means of a gentle character were entirely neglected, as inconvenient or incompatible; yet their adaptation to the form of fever now before us cannot, I think, be doubted; especially when the local congestions, irritations, and inflammations are seated in the abdominal organs. The continued introduction of pellets of ice into the stomach is often productive of relief; but they act merely as local coolers, by absorbing their caloric of fluidity from the parietes of the organ. Of all refrigerants, I suppose water

to be the greatest; and am quite convinced that its powers in this, as well as many other forms of fever, have not yet been fully tested. After the stomach and bowels have been evacuated, if the former should not be irritable, water should be drunk in large quantities; and, to give it greater efficacy, the system should be brought slightly under the influence of an opiate. As a topical application to the irritated or inflamed mucous membrane of the alimentary canal, it is one of the most soothing. But passing readily, by endosmosis, into the gastric veins, it is carried not only through the liver, but the entire organism; diluting the blood and allaying the febrile irritation of the solids, abdominal, thoracic, and cranial. Thus it is at once a cooler and a soother; and being one of the sustainers of life, refreshes and invigorates, while it allays morbid action. Other effects, however, result from its liberal introduction into the bloodvessels. All experience proves that the system makes unceasing efforts to keep the amount of water in the blood uniform; and, hence, when the quantity is increased, the secretory apparatus is immediately excited into increased action, for the purpose of throwing off the superabundance. To what extent the secretion of the liver may be promoted by this agency we cannot decide; nor do we know in what degree the pulmonary exhalation may be augmented; but from analogy, may presume, that both, and especially the latter, are increased. As to the other secretions there can be no doubt, for a flow of urine or of perspiration, according to the circumstances under which the individual is placed, invariably occurs. To obtain the former, the nitrate of potash or the spirit of nitrous ether, may be administered in appropriate quantities during the period of aqueous dilution. The first has long been regarded as a valuable refrigerant, and the last has maintained a high rank, as a febrifuge, under every modification of the theory of fever; while both direct the superfluous water upon the kidneys, and by increasing their secretion, eliminate from the blood, many things developed or thrown into it during the Fever, which reactively, keep up the febrile irritation. But the action of the diluent upon the skin is still greater than upon the kidneys, if the patient be placed under circumstances favorable to perspiration. These are rest, silence, and diminished light; adequate covering; heat to the extremities, and the administration of gentle narcotics and diaphoretics, such as a hot infusion of serpentaria, balm or orange leaves, with small portions of Dover's powder, or the following mixture:—

R.—Spiritus Mindereri, - - - - -	℥viss.
Spirit of nitrous Ether, - - - -	3ss.
Camphorated tincture of Opium, - - -	℥ss.
Wine of Ipecac, - - - - - -	℥ss.—Mix.

Half an ounce of this mixture, taken every two hours, will seldom fail to bring on perspiration, if the pathological condition of the patient be such as to admit of the restoration of that function of the skin. On the value of

such an effect there can be but one opinion. The centrifugal determination of the blood, without which the perspiration cannot be established, of course tends to relieve the internal organs from congestion; the reactive influence of an improved state of the skin upon the liver and the mucous membrane of the stomach and bowels, must be admitted as a reality; finally, the blood is depurated of peccant matters, which often give to the perspired fluid an offensive odor; and, retained, irritate the interior of the arteries.

IX. Sulphate of Quinine.—The various means which have been pointed out, have for their object to convert the remittent into an intermittent: to produce a state of apyrexia, unaccompanied by visceral congestion, irritation, or inflammation. In many cases this is slowly accomplished each remission becoming more perfect than the last; but in some the end is much sooner attained. When it is reached, the patient, as in the common inflammatory form of remittent fever, treated with active antiphlogistics, will sometimes recover if left to himself; but this should never be assumed; for, on the succeeding day, the paroxysms may return and prove as fatal, as the fit of a malignant intermittent. Had this fever been of a continued type, from some common cause, such an event could not occur; but being essentially periodical, the antiperiodic should, on no account, be now omitted. The quinine, which up to this time, when the remission has become more perfect, could not have been administered with advantage or even impunity, will now begin to establish in the system its peculiar effect; and the recurrence of the paroxysm will, at length, be precluded. It is not necessary to dwell on the mode of administering the quinine in such a case. Before an intermission is effected, it must be used in small quantities. But when that state is brought about, it may be given in five or ten grain portions, in connexion with solid opium, and repeated every two or four hours. If great exhaustion should be present, it will be requisite to stimulate the patient with camphor, ammonia, or tincture of capsicum, wine-whey, wine, or ardent spirit; and, at an early period, to give him a moderate quantity of nourishing diet. His feet should be kept warm, and a gentle diaphoresis maintained. Should there be a tendency to diarrhœa, which the opium does not arrest, injections of starch, and a decoction of Peruvian bark, with laudanum, will be efficacious. If bile do not appear in the evacuations, small doses of blue pill may be conjoined with the quinine and opium, or the region of the liver may be sponged with a strong nitro-muriatic solution.

When one day has passed without a recurrence of the paroxysms, the patient will probably go on to recovery; but the quinine must not be discontinued, for the type may now change from quotidian to tertian; and, on the third day, the fever may return, unless the system be kept under the influence of the specific.

X. Cases and Remarks from Doctor Ames.—The following condensed account of seven fever cases, from Doctor Ames, of Montgomery, Alabama, shows that in negroes, at least, a manifest irritation of the brain does not

contraindicate the employment of the sulphate of quinine without previous evacuation. The symptoms and treatment were nearly the same in all, and all recovered.

"Tongue slightly coated, ash-colored, yellowish, or natural; sometimes dry, but never hard or fissured. . Heat of the trunk and head natural, or a little below; .legs and arms cool; feet, hands, nose, and ears, cold. Pulse from one hundred and twenty to one hundred and forty, small, feeble, and indistinct. The brain strongly affected—coma and delirium alternating; the latter violent when the patient was disturbed; indisposition to speak; aversion to swallowing with obstinate resistance. The stomach and bowels natural, except a little nausea in two or three. *Treatment* substantially the same in all. Blisters to the neck; mustard to the extremities; and sulphate of quinine in large doses, without regard to the stage of the disease. Convalescence in the whole begun before the fourth day."

Another case affords evidence coincident with this:—

"A young gentleman aged sixteen, was attacked with a chill, which was quickly succeeded by convulsions. His pulse was about eighty beats in a minute, nearly as full as in health, but soft and hollow; he soon became comatose, but was sometimes wakeful, and restless; the temperature of his skin was everywhere natural; his pupils were dilated; he refused to swallow anything but water, and screamed and struggled violently when disturbed; did not speak, or even attempt to articulate. He continued in this state about forty-eight hours, during which he was bled to ten ounces, with a bad effect. He was repeatedly immersed in a warm bath, having cold applications to his head; he took a cathartic, which operated promptly; blisters were applied to his neck, arms, and thighs. Attempts were made to administer quinine; but, for some time, very little was swallowed; at length, however, he took it regularly and freely, with immediate benefit and complete recovery."

The following observations, from the same gentleman, present still further the results of his experience in the soporose, malignant fever, of the region around Montgomery:—

"The coolness of the surface, in these cases, is never the coldness of collapse; nor is there ever the profuse sweating, the diarrhœa, vomiting, epigastric oppression, sighing, jactitation, and general restlessness, characteristic of abdominal, congestive remittents; neither have I, at anytime, observed muttering delirium, or picking of the bedclothes; headache is never spontaneously spoken of after the disease is fully developed, though it is a common precursory symptom. The aspect of most of the cases is that of profound sleep, but without the stertor or pulse of apoplexy. Now and then I have seen a case in which the skin was above the natural temperature, with throbbing of the carotids, but the pulse had no firmness. In that condition the coma is less profound. The refusal to swallow medicine is a characteristic of this form of fever."

"Quinine is better borne in congestive remittents and intermittents, than in any other form of fever. It is tolerated by the system, as tartar emetic is tolerated in pneumonia, and bloodletting in cerebral inflammation. I lately gave a negro boy, under twelve years of age, about fifty grains of quinine, within twelve hours, without producing deafness or ringing in the ears. Its good effects, however, were none the less evident. Bleeding, as far as I have seen, even in small quantities, does harm. Blisters and sinapisms are valuable adjuncts, particularly the former, and so is the hot foot bath. Nothing can be said in favor of purgatives; though I have occasionally seen full vomiting with tartar emetic, produce the best effects. When the pulse, under the use of quinine, gets more feeble as it becomes slower, with a copious supervening sweat, I know of no remedy equal to carbonate of ammonia, the quinine being at the same time suspended."

CHAPTER IX.

PROTRACTED, RELAPSING, AND VERNAL INTERMITTENTS.

SECTION I.

CHRONIC AND RELAPSING CASES.

I. We have already seen, that many facts conspire to prove that all the varieties of autumnal fever, depend on one specific, remote cause, and, we now come to an additional fact in support of the same conclusion. It is, that in many cases, the different forms of remittent fever, at last, assume an intermittent type; and continue to recur, for an indefinite period, in the manner of original, uncured intermittents; from which, in fact, they cannot be distinguished. This being the case, I have postponed an account of their character and treatment, until all the acute varieties of the Fever, of which they are properly the chronic form, should have been studied.

II. Regular, Chronic Recurrence.—When an intermittent becomes chronic, it generally shows a disposition to recur, at more distant intervals. A quotidian, it is true, if neglected, may continue as such for several weeks; but such cases are not numerous, and a change to the tertian type is a common event. There are, moreover, many original tertians, which become chronic. In this form, when not arrested, they may run on for months. Sometimes a recurrence on the fourth day, including that of the preceding paroxysm, gives us a quartan; much more rarely, the return is on the fifth day, constituting a quintan. A recurrence on the seventh day (septan) is, however, common. This is the day on which the third paroxysm of a

tertian, and second of a quartan, would return; which, perhaps, explains the liability to recurrence on that day. But discarding all speculation, I may state as a fact, that the hebdomadal period is, pre-eminently, that of many protracted intermittents; the recurrence of the paroxysm being, in some instances, between the thirteenth or fifteenth, in others the twentieth, twenty-first, or twenty-second, and in others the twenty-eighth, twenty-ninth, or thirtieth day. Still further, in some instances, after the Fever seems to have ceased entirely, it returns at a multiple of this hebdomadal period. The following case, from Doctor Raymond, illustrates this point: In the autumn, he had three paroxysms of intermittent fever. The next spring it returned, and was arrested by an emetic and half a drachm of quinine. In twenty-one days it recurred, and continued its visits, at the end of that period, until August. He was then bled, after which its recurrences were at the end of the fifth, instead of the third hebdomadal period, until December, when it was finally stopped by arsenic.

The causes which render intermittents protracted, deserve consideration.

1. Of the whole we should, undoubtedly, ascribe the greatest influence to the agent which produces the disease. It is of the very nature and essence of that agent, to generate an intermittent irritation; which shall soon pass away, but return at the end of twenty-four hours from the beginning of the previous fit, or at the end of some multiple of that period. We cannot, I apprehend, go further than to recognise the fact. In some constitutions, the primary impression wears out much sooner than in others: the latter present us with the disease in a chronic form. It is common to say, that the fits recur from habit; but habit is custom confirmed; and the question in these cases is, what maintains the custom until it grows into a habit? One person has a habit of waking at a certain hour in the morning; another at a different hour; in both cases some agent was employed to create the custom; but, after a time, that agency may be withheld, and the effect will continue from habit. Intermittent fever, then, cannot become chronic from habit; but having been made so by the influence of some cause, habit may, at last, contribute to reproduce the paroxysms.

2. The Fever is sometimes kept up by the unabating action of the remote cause. Thus, there are many instances of its continuance as long as the patient remains in the locality in which it was produced, and of its ceasing on his removal to a more salubrious spot.

3. It is probably rendered chronic, in certain cases, by the permanent congestion or subacute inflammation of some organ.

It is held by many of our people, and, perhaps, by some physicians, that if chronic intermittent fever be not interrupted by medicines, but allowed to run its course, until it ceases spontaneously, the individual, although continuing in the same locality, will, ever after, remain free from an attack. His system loses its susceptibility to the poison. A gentleman, in Illinois, assured me that this had been the result in his own case; and that he was

at that time; and the symptoms, and most successful treatment, mark them as relapses, instead of attacks from a new application of the remote cause. It would appear, that the steady cold of winter, is much less injurious, than the diurnal and occasional vicissitudes of February and March, in the South—of March and April, in the middle latitudes—and of April and May in the northern. After the hot weather has set in, they commonly cease; and this is the termination of the epidemic of the preceding year; which, beginning in the last month of summer, ends in the last month of spring. The Fever of the next autumn, depends on a new development and application of the remote cause; to the action of which, however, those who suffered the year before, are, very commonly, as liable, as those who might not have resided in the locality at that time, and, in many instances, more so.

The exciting causes of winter relapses, are equally productive of the vernal; and one of them—undue and chilling exposure of the surface of the body—is far more general; from the imprudent and premature disuse of flannel, and of winter clothing, upon the access of warm weather. Those who are obnoxious to the Fever, should therefore wear their flannel, till the hot weather is established, or even throughout the summer; and should carefuly avoid exposure to the stormy weather of the equinox, or the sudden showers of April, both of which are more injurious than the snows and northwest winds of winter.

It is a popular opinion, that standing or sitting in the sun, in spring, will bring on a relapse; but this I apprehend, is an example of false observation —the transposition of cause and effect. Those who *are* relapsing, find such exposure pleasant; a full development of the disease follows, and is fallaciously ascribed to the influence of the sun's rays.

The relapses which occur late in spring, are apt to present more of gastric and biliary derangement, than those which happen early. This results from the impress of heat, and the same cause, gives to the hot stage of the paroxysm, more intensity than it displays at any earlier period. These facts have led to the opinion, that the special, remote cause is generated *de novo*, at that time; but I see no reason for the supposition.

As a general fact, vernal intermittents are not violent nor dangerous, but there are exceptions; and the following observation, communicated to me by Doctor France, is one of the evidences. In Powell's Valley, Virginia, intermittent fever was epidemic in the autumn of 1843. January was cold, but early in February, the weather became so warm as to give an impulse to vegetation; during which the Fever reappeared in a great number of persons, and, in many, assumed a malignant character.

II. Deferred Attacks.—The intermittents of winter and spring, as we have seen, are chiefly relapses, but there are, also, new cases. These are not to be ascribed to a reproduction of the special, remote cause, in those seasons, but to its impress in autumn; which impress was not followed by the Fever, at that time. On *page* 370, *Vol. I.*, a case is related, in which the

Fever appeared within three days after an exposure to its remote cause. The case now under consideration proves, that many months may elapse, before its development. For the existence of such cases, I may refer to the experience of every observing physician, who resides in regions infested with autumnal fever. Indeed the profession are familiar with vernal intermittents, in those who had not suffered in autumn; all of whom, however, had been exposed to the remote cause. Many years since, the following fact fell under my own observation. A Cincinnati family made an overland journey, in autumn, to the State of New York, travelling slowly on the terraces of Lake Erie and Lake Ontario, which at that time were annually scourged with intermittent fever. Some of them were seized with the disease on the way, and others escaped. During the next spring when the Fever was not prevailing in the part of the city where they resided, some members of the family who had suffered in autumn, were seized with it; and at the same time, one of the party, who had escaped, was attacked with the same disease. Another, and more conclusive observation, was communicated to me by Doctor Smith, of Racine, Wisconsin. When he resided in Vermont, two men made an autumnal visit to Western New York, where the Fever was prevailing; and returned without experiencing attacks. In the following winter, however, one of them was seized, and, in the spring, the other, with the same disease. No other persons were attacked; and, indeed, no case of the kind had before occurred, in the part of the state in which they resided. At Quebec, where the Fever does not originate, Doctor J. Douglas informed me, that he had repeatedly known persons attacked with it, several months after their return from more southern regions, where it was prevailing; although they continued in health while there. These cases are analogous to those of Irish immigrants, who are, sometimes, taken with typhus fever, several months after their arrival in the West.

It is, perhaps, not correct to apply the term incubation, to the period which elapses in such cases, between the application of the poison, and the outbreak of the Fever. In the case of small-pox and of hydrophobia, there is a progressive, or ingravescent change, perhaps in the innervation, which ends in the production of specific, morbid phenomena, that do not require an exciting cause to bring them out. But in deferred intermittents, the morbid impression constitutes a mere predisposition, which slowly wears away; and cannot, without the aid of exciting causes, originate the Fever. On the evidence which these cases afford, of a specific, efficient, remote cause, I have already spoken.

SECTION III.

TREATMENT—HYGIENIC AND MEDICAL.

I. Treatment of Winter Cases.—1. I have introduced the word hygienic, into the title of this section, for the purpose of strongly directing

the attention of the reader, to the more important part of the treatment. It may be truthfully affirmed, that after intermittent fever has been arrested, it would not often—perhaps never—recur, if all exciting causes could be avoided. Of course that is not practicable; but every predisposed person should withdraw from them, as perfectly as possible. Thus, the hygienic regulations deserve great attention. Warm clothing, with flannel next the skin, and shoes that will keep the feet dry, are necessary; but the patient should not house himself; for that would prolong his liability. On the contrary, with the surface of his body adequately protected, he should boldly encounter the cold of winter, and take a great deal of active exercise. The muscular effort will increase the depuration of his blood, by promoting pulmonary and cutaneous transpiration, while it invigorates all his solids. It will, moreover, give impulse to the portal circulation, and assist in rousing the sluggish abdominal organs into healthier action. The loss of sleep should be guarded against. To lodge warm is essential; but on rising in the morning, the surface of his body should be dashed with cold water; and then wiped dry, the friction being continued until it reddens the skin. Finally, his diet should be savory, nutritious, and digestible.

2. The medical treatment of these cases, has been in part anticipated, when speaking of the cure of simple intermittents. It resolves itself into that which is proper to prevent the return of the disease, and that required when it has recurred; and, *first*, of the former.

Some persons are in the habit of taking small doses of quinine for this purpose; but they often fail. They do not establish a quinic diathesis, which, for the time being, would always arrest the paroxysms; nor do they give tone to the system. As a prophylactic, in these cases, the bark is much to be preferred, on account of its tonic, not less than its antiperiodic properties. A teaspoonful before each meal, will, in general, answer the purpose. The impoverished state of the blood, moreover, suggests the use of chalybeates; of which, perhaps, no preparation is better, than the protocarbonate of iron. It may be given in an electuary with the bark; for I am not aware, that the latter will lose any of its efficacy by yielding up a part of its tanno-gallic acid to the iron; or that the salt thus formed, will not produce all the effects of any other chalybeate preparation. Recently, a new preparation, the ferro-cyanate of quinine, has been introduced in practice, and, *prima facie*, seems likely to be useful; but I have not tried it, nor informed myself of the experience of others. Arsenious acid and opium, sometimes root out the predisposition to recurrences; but to do so, their administration should be continued, until the arsenical œdema is produced. The preservation of a regular habit of body is important; but in obviating costiveness, the cold and debilitating laxatives should be avoided. When required, powdered rhubarb may be added to the bark; or the tincture of rhubarb and gentian may be chosen; or pills composed of blue mass, rhubarb, galbanum, and aloes, made into a mass with extract of gentian, may

be given. Whatever medicine is chosen, it should not be allowed to operate more than once or twice.

But all these things fail in some instances, and a treatment of the opposite kind succeeds. In such cases there is, probably, a subacute inflammation of some organ, as the spleen or alimentary membrane. From Doctor Frye, of Illinois, I have learned, that he has frequently succeeded in these refractory cases, by laying aside tonics and stimulants, and administering an eighth of a grain of tartarized antimony, with ten grains of hydrochlorate of ammonia (sal ammoniac), given every two or four hours.

We come, in the *second* place, to the treatment required in the paroxysm. If the existing symptoms should indicate functional biliary derangement, a mercurial cathartic will be proper; and if the stomach should be dyspeptic, an active emetic will do much good; but, in many cases, all evacuation may be dispensed with, and immediate recourse had to quinine and opium; which will, almost infallibly, arrest the disease so promptly that not even another paroxysm will occur. The proportion of opium should be large; for, in the condition of the system we are now considering, there is great toleration of that medicine.

We must not forget, that along with these relapses, may come an inflammation of some organ, that will render these measures abortive or even injurious. Thus the very cause which reproduced the paroxysm, may revive or generate a hepatitis, a splenitis, or a pneumonitis, in which case a certain amount of the treatment, required for the inflammation, will be necessary. In proportion as the inflammation is severe, the signs of its existence will be more or less present during the intermission. I have had many patients of this class, whom it was necessary to bleed copiously; but, further south, or in places where intermittents greatly prevail, copious bloodletting is inadmissible, and calomel, tartar emetic, cupping and blistering, must be employed. Everywhere, however, it is necessary to connect the opium and quinine practice with the depletory.

II. Treatment of Vernal Intermittents.—The hygienic means of preventing vernal intermittents, are the same as for those of winter. In spring, as we have already seen, one exciting cause is the great diurnal change of temperature. The elevated heat, after the system has had its susceptibility to caloric increased by the cold of winter, renders many persons impatient of warm clothing, and prompts the imprudent to throw it off too soon. In doing this, however, they begin wrong. Instead of laying aside their winter coats, they take off their flannel, thus depriving the skin of a stimulus to which it had become habituated: whereupon it readily falls into torpor. Those who are strongly predisposed to attacks, generate but little animal heat; and, as we have already seen, instinctively expose themselves to the hot sun; which greatly increases the influence of low temperature, in the following night and morning. In addition to all this, damp southwest and northeast winds, about the time of the vernal equinox, act with sinister effect on the inadequately protected surface.

The required treatment of vernal intermittents, is somewhat intermediate between that of autumnal and that of winter cases. In spring, the returning solar heat quickens the liver into action, and bilious appearances are then more common than in cold weather; the appetite oftener fails, and nausea, with other signs of gastric derangement, occurs in a greater number of cases. Hence, active evacuation of the stomach and bowels, is useful in many cases, and in some, almost indispensable. With this preparation of the system, or without any, in cases of a simpler kind, the antiperiodics may be administered, as in winter intermittents; and generally with the same immediate advantage. Now and then, however, a case will prove refractory, and continue until arrested by the heat of the summer solstice.

III. CHANGE OF LOCALITY.—Some persons are so susceptible to the impress of the remote cause of intermittent fever, or the habit of recurrence is so readily and firmly established in their systems, that as long as they continue in an infested locality, the disease will set all the efforts of art at defiance. Change of place must then be submitted to, or the constitution will be ruined. In this, two objects should always be had in view: *First*, To seek a locality where the Fever is not endemic. *Second*. To reach a cooler climate, by change of latitude, or change of elevation. The former end may be accomplished by entering the depths of a city; by sojourning on the sands of the Pine woods; by wandering in the desert west of the Mississippi, or emigrating to Santa Fé; all, without reference to a cooler climate. The latter end is attained by ascending the Appalachian Mountains, where the Fever is nearly unknown, and the air invigorating. Of the regions fitted for this purpose, one of the most eligible is that around Chautauque Lake, described at *page* 97, *Vol. I.* But all the benefits of mountain air may be enjoyed, without ascending above the mean level of the Valley, six hundred feet, by going northerly. To this end, a voyage up the Mississippi, and a summer residence in the neighborhood of the Falls of St. Anthony; or a voyage to Mackinac and Lake Superior; or down the St. Lawrence to Quebec, and the deep chasms of the Saguenay, in the latitude of forty-eight degrees, may be performed with great facility. As soon as the patient reaches a region in which the fever is not endemic, he feels that his redemption has begun; and, in a few weeks, finds himself quite restored. In the autumn of the next year, however, he may experience a new attack, when he should, if practicable, change his residence for a city or a colder climate.

When the constitution of a citizen of the South has, by fever or climatic influences, become seriously enervated, it is sometimes necessary to seek a colder climate, in winter, for the purpose of invigorating his constitution; that of the South being too mild for that purpose. By going north, in summer, he may, it is true, escape the Fever; but the heat of that season is there, for a while, high, and he may return without all the reinvigoration that is desired. Under such circumstances, the influence of cold is neces-

sary. With this conviction, Doctor Cartwright, of Natchez, not long since, spent the greater part of a winter in the latitude of St. Louis, Louisville, and Cincinnati, fearlessly exposing himself, as he informed me, to the most rigorous winds, and returned home with a renovated constitution.

IV. Popular Empiricism.—Where agues prevail, many cases not subjected to enlightened medical treatment, become chronic, and are at last broken up by some sudden impression on the nervous system. I refer to these experiments, not to legitimate them in our catalogue of remedies, but as throwing light on the pathological condition of the system; as evincing that the disease, when thus prolonged, becomes a neurosis.

A case of the kind we are considering, is sometimes permanently arrested, by a violent emetic, taken just before the chill. It imparts a shock to the nervous system, which destroys the disposition to recurrence. A countryman informed me, that he stopped a tertian ague of eleven months' duration by taking, just before the fit, a quantity of gunpowder, mixed with rum. It produced on his system a powerful impression; and excited a profuse sweat, which continued for twenty-four hours, after which, the disease did not return. A very copious perspiration, produced by other means, has sometimes succeeded. The same beneficial result has, in other cases, been attained, by rapid riding on a hard-trotting horse, just before the paroxysm. The sudden effusion of very cold water has produced the same result. Doctor Joshua Martin, of Xenia, Ohio, knew the disease permanently cured in a small boy, by standing him on his head, at the access of the fit. Here was both a corporeal and mental effect. In many instances the recurrence has been arrested, by means which acted entirely on the imagination and feelings. Of this, kind are various loathsome potions, which the patients have swallowed with disgust; and different charms or incantations, which raise powerful emotions, that change the innervation, and destroy the habit of recurrence.

V. Salutary Effects of Chronic Intermittents.—It has often been said, that protracted agues sometimes cure chronic diseases, and improve the health. That one disease may supersede another, from incompatibility of action, is certain; but I have not met with facts which establish the remedial influence of intermittent fever. On the contrary, impairment of the constitution, has been the general result of protracted cases.

The alleged benefit to the consumptive, of a sojourn in localities productive of ague and fever, will be discussed hereafter; and I will only remark in this place, that I once saw a paludal intermittent, unite itself with hectic fever; but not to the end of effecting a cure.

CHAPTER X.

PATHOLOGICAL ANATOMY, AND CONSEQUENCES OF AUTUMNAL FEVER

SECTION I.

MORTALITY OF AUTUMNAL FEVER.

A SIMPLE intermittent fever, even when left to take its course, rarely, perhaps never, proves directly fatal, but it may derange the structure of some organ, or generate a kind of cachexia or spanæmia,* from which, as pathological causes, other, and at last fatal consequences may follow.

Many simple remittents, in the new settlements, are allowed to run their course without the superintendence of a physician; though seldom without some kind of medical treatment. In the early settlement of Kentucky, and Ohio, this was oftener the case, than in any of the new settlements of the present day; for considerable districts of country were, then, without physicians. In the former state, more than fifty years ago, I saw numerous cases, for which but little was done. In reference to these, as they occur in the middle latitudes, it may, I think be said, that they are not often mortal; but sometimes run a course of ten or fifteen days, and gradually cease, or degenerate into agues.

Inflammatory intermittents demand the interposition of art to bring them to a favorable termination. Left to themselves, it is true, they will not in general destroy life, immediately; but the persisting inflammation of some vital organ may at last give a fatal termination. Under a well-known treatment, however, such cases may generally be cured.

It is otherwise, with inflammatory remittents, which, in their advanced stages, often take on a typhous character, and prove fatal. Of the proportion who die, it is impossible to speak. I have proposed to our brethren, in various places, to send me returns of the annual relative mortality from the different diseases, occurring in their practice; but the amount of material thus obtained, is, as yet, too small to justify its presentation. I do not believe, that simple and inflammatory remittents, are more fatal in the South, than in the higher latitudes; but the mortality from them is greater, because they occur more frequently.

Malignant intermittent fever, is always mortal when not arrested by art; and many die from it every autumn, its true character not being perceived in time, or the patient residing beyond the range of enlightened medical practice. Where this variety prevails, therefore, it constitutes, in autumn, the chief outlet of human life; notwithstanding a successful mode of treatment has been discovered.

* From αἷμα, blood, and σπανὸς, poor,—poverty of the blood.—Simon's Animal Chemistry.

Malignant remittents are not so common as intermittents, but more difficult of cure, and, therefore, much oftener fatal.

In traversing the Interior Valley, from north to south, we find, that the number of deaths from autumnal fever, as compared with the number from all other diseases, constantly increases. In the higher latitudes, the prevalence of this fever is less, the variety of diseases greater, and the deaths distributed more equally through the year. In the South, the chief mortality is from July to November; though, in certain winters, large numbers die of pneumonia, engrafted on constitutions, enfeebled and deranged, by the insalubrious air of the previous autumn. Still, it may be affirmed, that below the thirty-third parallel, the inhabitants enjoy more uninterrupted health, for eight months of the year, than in any other part of the Valley; and hence it was not without reason, that the distinguished Professor Caldwell, several years since, attempted to show, that taking the year round, New Orleans was the healthiest city on the continent.

SECTION II.

CONDITION OF THE BLOOD IN AUTUMNAL FEVER.

Observation has established the fact, that the blood, in our autumnal fevers, may, or may not, show the buffy coat. In my own practice, it has been much oftener absent than present, and I have seldom seen it cupped. In most cases, the amount of fibrinous crust is not great; and, in the majority, it shows itself only in islets, or patches, which are sometimes indistinct. With these observations, I have found those of a great number of the physicians in the middle and higher latitudes of the Valley entirely correspondent. It is obvious, then, that a state of hyperinosis,* is not essential to these fevers; and that when it does exist, and is made manifest by sizy blood, it is at once the effect and sign of an accidental inflammation. In general, the clot is large and soft, resting on the bottom of the bowl, and not swimming in serum, because the contraction has not been close enough, to press out that fluid, in large quantities. This may, in some cases, arise from the plethora of the patient before his attack, in which condition the red corpuscles are increased in quantity; in others, there may be a state of hypinosis,† or deficiency of fibrin.‡ In reference to the former, I may say, that men of a sanguineo-lymphatic temperament, the usual subjects of plethora, are oftenest the subjects of autumnal fever. The serum in this disease, is sometimes yellow from the coloring matter of the bile; but I have not found it bitter.

I do not know, that any experiments have been made on the relative proportion of the proximate elements of the blood, in *our* autumnal fever.

* From *hyper*, excess, and *is-inos*, the fibre of the flesh. † From *hypo*, deficiency, and *is-inos*.—Simon.
‡ Essay on the Blood in Disease.—Andral.

Andral and Gavarret, in the hospitals of Paris, made such experiments on the blood of seven patients, laboring under intermittents of long standing; and found the mean proportion of fibrin to be three and a third of one thousand parts, the normal quantity being three. As many chronic cases of the Fever, are made such by inflammation of some organ, we may presume, that in these cases some were complicated with such inflammations. As to the other proximate elements of the blood, the solid residue of the serum, was eighty parts in the thousand, the natural proportion; but the blood-corpuscles were, on an average, one hundred and four parts in a thousand, while one hundred and twenty-seven, is the normal number. Thus, it appears, that protracted intermittents, produce impoverishment of the blood—spanæmia—the condition present in chlorosis; and this accounts, in part, for the peculiar hue and puffy visage, of old ague patients, who so closely simulate chlorotics, in their appearance.

SECTION III.

PATHOLOGICAL ANATOMY OF INTERMITTENT FEVER.

It has been already said, that our simple intermittents do not prove fatal; how then can we know, by anatomy, whether any single organ always suffers? If any one be invariably affected, it is undoubtedly, the spleen, if we may depend on what is presented by patients laboring under chronic and relapsing agues. Our inflammatory intermittents, moreover, but seldom prove mortal; but they often show signs of splenitis; and when the subjects of them die, subsequently, of other diseases, it is common to find vestiges of serous splenitis, in old and firm patches and bands, of coagulated lymph; which sometimes distort the organ, and at other times compress it, and, by limiting its circulation, produce a state of atrophy. During the ten winters in which I delivered clinical instruction in the Louisville Commercial Hospital, my colleague, Doctor, now Professor Bayless, and myself, met with many examples of what is here described; the patients having died of other maladies than intermittent fever.

The anatomy of our malignant intermittents ought to be well known, but it is not; for in the country, the prejudices of the people against post-mortem inspections, especially after death from common diseases, is almost unconquerable; and in our cities the disease scarcely ever occurs. It must be confessed, moreover, that from want of practice in dissections, many of our brethren, living in new and remote settlements, infested with this fever, are not as well prepared to report on morbid appearances, as some of those who have greater opportunities of cultivating pathological anatomy, in places where the Fever seldom occurs. In travelling, I was only able to collect the subjoined observations.

1. Assistant-Surgeon Holmes, gave me the following case. A soldier, in

Florida, of intemperate habits, but vigorous constitution, died in sixteen hours, that is, in the first fit of a malignant intermittent. The chief signs of congestion during life, were in the chest, the parietes of which, displayed an ecchymosed appearance. Blood could not be obtained by venesection. Eight grains of tartar emetic operated as a cathartic; after which he took large doses of the sulphate of quinine. On examination after death, the mucous membrane of the stomach was found healthy; that of the bowels had more or less congestion; the liver showed signs of the same condition; and the spleen was double its natural size; but healthy in texture and appearance. The cavities and substance of the heart were engorged, and the lungs were loaded with blood. The brain was not examined. This individual had probably experienced a previous attack of intermittent fever, which produced the enlargement of the spleen, and hence its natural appearance, except in size. The fatal congestions were in the lungs, as the symptoms indicated.

2. Another case from the same gentleman: A soldier, who had labored under chronic diarrhœa, was taken in the morning, and died at night. His brain seemed to be deeply implicated; as he experienced numbness, had a vacant gaze, lost the power of speech, and became insensible; but still continued to sit up, until he was about to expire. He was cupped on the neck, had a stream of cold water poured on his head, while his feet were immersed in a hot bath, and took large doses of the sulphate of quinine and carbonate of ammonia—all without effect. *Post-mortem appearances.*—The external parts of the head were in a state of congestion, and the brain was covered with engorged vessels, but its substance showed very little hyperæmia. The lungs were moderately engorged. The stomach and bowels showed traces of inflammation. As this patient had labored under chronic diarrhœa, it may be presumed that the latter condition existed before the fatal attack.

3. The following observation was given me by Dr. Boling and Dr. Baldwin, of Montgomery, Alabama: A man had the characteristic symptoms, but the fits were so mild, that he rose from his bed, and "kept about" between them, for five or six days. The fatal paroxysm then came on, and he died in twenty-four hours. During the disease, his tongue was dry, smooth in the middle, furred on each side, and red at the edges and tip. *Post-mortem appearances.*—His stomach was empty. In its greater curvature, near the pylorus, patches of hyperæmia, with softening. The small intestines, particularly the lower part of the ileum, exhibited the same appearance. The spleen and liver were healthy.

4. I am indebted to Dr. Sims, of the same city, for the following: A man, not attended by him, was said to have died in the second or third paroxysm, with the usual symptoms. The dissection was commenced before the body had entirely lost its heat. The lungs, liver, and spleen, with all the venous trunks connected with them, were distended with uncommonly

dark blood. The stomach contained the medicines, not spread over it, but was natural in appearance, and so were the bowels; but near the ileo-cœcal valve, there was a quantity of black, tar-like matter, similar to the contents of the gall-bladder.

5. Dr. Pennick, of Wetumpka, Alabama, observed the following case: A man was taken with what appeared to be an ordinary chill, but became dizzy; and falling, cut his scalp through to the skull. In the first fit, his breathing was embarrassed; in the second, it became stertorous, and he died. On examination, his brain was found in a state of congestion, with serum in the ventricles. The mucous membrane of the stomach, exhibited a spot of a dark, modena-red color, and that of the bowels, two others of the same kind.

6. Several physicians, of Greensboro', Alabama, in the course of their joint conversation with me, on malignant intermittents, mentioned two *post-mortem* inspections, which they had witnessed. In one, there was considerable engorgement of the brain; in the other, a great congestion and enlargement of the spleen. The splenic region was tender, before death. No other morbid appearances were recollected.

7. Dr. Haywood, of Tuscaloosa, in the same state, informed me, that he had made a number of dissections of persons dying of this fever, in which he could detect no morbid appearance, except, in a part of them, a slight hyperæmia of the mucous membrane of the stomach, which he supposed to have been produced by medicines.

8. Dr. Echols, of Selma, in the state just mentioned, informed me, that he had examined several who had died of the disease, without finding any morbid appearances, except enlarged spleens in a part of them.

9. Dr. Christian, of Memphis, Tennessee, had examined a few subjects, in which he found the stomach but little altered; in one case (which must have been protracted), the liver was suppurating; in others that organ was enlarged; in most of them the spleen and brain were engorged.

10. Dr. Frye, of Peoria, Illinois, had examined two subjects, dead from the same fever. One of the patients had labored under incessant and uncontrollable vomiting. The stomach and liver were found in a state of congestion. The spleen was enlarged and softened.

11. Dr. Ridgely, of Cincinnati, examined the abdominal organs of a boy five years old (*see Vol. I., page* 80), who died of the Fever, and found the stomach and bowels free from lesion; the liver was unusually firm, and of a leaden hue; the spleen enlarged, engorged, and of a dark color.

12. A gentleman, living in the interior of Indiana, had his constitution impaired by several attacks of the Fever. Three years elapsed without any, though he continued in the same locality; but he was none of the time in perfect health. He then undertook a summer visit to Cincinnati; and, on the way, had a malignant paroxysm. On reaching the city it recurred, and Dr. Ridgely was called in. He found the skin of the patient cold, and

of a dark and dirty copper hue, which it had exhibited for some time before; his pulse was feeble and rapid; his mind wandering with short periods of drowsiness. In a few hours he expired. A *post-mortem* inspection revealed the following lesions: The lungs slightly engorged; heart softened and apparently atrophied; mucous coat of the stomach and bowels softened; liver somewhat enlarged, tender, and friable; spleen enlarged, and almost decomposed into a grumous mass. Finally, a most offensive putrefaction followed in a few hours after death. In this case, no doubt, many of the lesions had been produced by previous attacks of the Fever.

Although these observations offer very little that meets the demands of exact pathology, seeing that the brain and spinal cord, with a few exceptions in favor of the former, were not examined, and that the lesions of the other organs are given in a vague and general manner, still they are not altogether valueless, and we may devote a paragraph to their generalization.

1. In several cases, very few traces of disease were found. The patients died from nervous depression; and whatever congestions may have been formed, nearly disappeared, while the patient was *in articulo mortis*.

2. In the cases in which the brain was examined, it was generally found in a state of congestion; which is, perhaps, its invariable condition in soporose cases.

3. In the first case, characterized by pulmonary symptoms, the lungs were found in a state of great congestion; and, in several others, they were more or less in that condition.

4. The stomach and bowels in each patient were in nearly the same degree of lesion; but in none were the traces of disease great. In several, those organs were natural; in about an equal number more or less congestion existed; but in two or three only was it regarded as inflammatory.

5. The liver, in several of these subjects, exhibited signs of congestion; in others it was quite natural; in one suppurating; in another dense to the touch; both of which conditions probably existed before the attacks of which the patients died.

6. The spleen was, on the whole, oftener affected than any other organ; but in one case it was reported natural; in several, not mentioned; when we may presume it was in the same condition; in the majority of the subjects, it was engorged and enlarged.

To sum up, we may say, that the signs of inflammation were few and uncertain; that passive congestions were common; that they occurred in the brain and lungs, but still oftener in the abdominal organs; above all, in the spleen; but that no organ was always affected, and consequently that none, according to these observations, is the invariable and characteristic seat of lesion.

SECTION IV.

PATHOLOGICAL ANATOMY OF REMITTENT FEVER.

I. A REMARK already made, concerning our knowledge of the lesions of structure in simple intermittents, is, to a certain extent, applicable to simple remittents. As they generally terminate in health, we can only judge from the symptoms, what organ or organs are especially affected. In many cases they degenerate or change into agues; and in time bring about the visceral derangements, consequent on chronic intermittents. But simple remittents have a mode of termination which distinguishes them from all intermittents. It is the typhous state or stage. In this metamorphic fever, the brain is always affected, either with simple hyperæmia, mere irritation, or inflammation. When coma, supervening at an early period of the change, is the prominent symptom, the first of these pathological conditions is perhaps predominant; when the supervention of cerebral symptoms has been sudden—and they consist of coma-vigil and delirium, with feeble and frequent pulse, active subsultus tendinum, and a locomotive propensity,—the second or irritable state of the brain exists; when the vigilance becomes morbid, with wild, loquacious, and singing delirium, cold feet, hot forehead, red eyes, contracted pupils, pulsating carotids, and more or less subsultus, with efforts at locomotion, inflammation may be assumed to exist; yet I have seen these symptoms, not excepting a closely-contracted pupil, immediately relieved, and recovery follow a large dose of laudanum; proving that they may depend on irritation only. Nevertheless, it may, I think, be received as a fact, that when patients die in what is called the typhous stage of simple remittent fever, it is generally from cerebritis; and that, after death, the principal lesions would be found in the brain, in the form of hyperæmias, and serous or fibrinous secretions; to which softening, perhaps, may sometimes be added. This cerebritis, however, cannot be admitted as an original affection, characteristic of the Fever.

But we must turn from the brain to other organs. The lungs, it is well known, are liable to inflammation in this fever; and instead of occurring late in the disease, like cerebritis, it generally arises at an early period. Such inflammation may prove fatal; and then a post-mortem inspection will show the lesions resulting from bronchitis or pleurisy; but more frequently still those of pneumonia, such as sanguineous engorgement and hepatization. But they cannot be regarded as constant, essential, or characteristic of autumnal fever; for, *first*, a vast majority of cases, even those which prove fatal, do not present a single symptom of pulmonary inflammation; and, *second*, this inflammation, in most instances, is the undoubted effect of the sudden changes of weather in the latter part of autumn; and must, therefore, be taken as the offspring of an incidental cause, acting subsequently to that which produced the Fever.

We are thus driven to the abdominal viscera, in our search after a lesion which may enter into the definition of remittent fever; and, which, being shown by symptoms during life, must be found by dissection after death. In all times and places, it has been observed, that this fever is accompanied, from the beginning, with functional derangements of the abdominal organs; and, in many cases, there are unmistakable symptoms of inflammation. The functional disturbances are found chiefly in the liver, stomach, and duodenum. To speak of functional disorders of the spleen, when we know not what its function is, would be an absurdity. Should the life of the patient be destroyed, while mere functional derangements prevailed, no morbid appearances might be found after death. They are but perturbations of the innervation, which carry into the circulation and secretions an altered action, different from that of inflammation. In simple remittents these disruptions of function may continue without generating derangements of structure, until the fever spontaneously ceases, or is reduced by art; in the highest grade of malignant remittent fever, the irritation and prostration of the whole nervous system may be so intense as to destroy life in two or three paroxysms, leaving no lesions of structure to be revealed by the knife.

But abdominal inflammation does occur in both inflammatory and malignant remittents. Moreover, it often commences with, or early in the Fever, and declares itself by legitimate signs. It arises independently of any co-operative or exciting cause; and, therefore, results from the same agency with the Fever. Finally, by its ravages, it shows itself to the anatomist after death. But is it always in the same part? It is not. There are three organs in which it is chiefly found. They are the spleen, gastro-duodenal mucous membrane, and liver. Occasionally it invades the whole at the same time; but oftener limits itself to two, and in many cases affects one only. None of them is affected in some cases; and, therefore, there is no *inflammatory* lesion in the abdominal viscera, which constitutes a peculiar anatomical character of remittent fever; any more than there is an ever present uniform lesion in those who die of intermittent fever. But we must proceed to inquire into the evidences afforded by autopsic examinations.

II. Post-mortem Revelations.—The facts supplied by our Valley for illustrating the pathological anatomy of remitting fever, are still fewer than for our intermittents. I am compelled, therefore to look abroad; but, am sorry that in doing so, I cannot find materials for a very full and satisfactory history.

At all times, occasional examinations have been made in Europe, the Atlantic States, and the Interior Valley; but they only announced, in general terms, the existence of congestion, softening, and inflammation, found in different cases, in all the organs of the cranium, thorax, and abdomen. A series of careful post-mortem inspections, by an able pathologist, was still wanting; and a few years since, Doctor Stewardson undertook to supply

the desideratum.* His dissections, seven in number, were made in the Pennsylvania Hospital, in the months of August, September, and October, which constitute the true period of prevalence of this fever.

The following is his summary of the pathological appearances.

"*Brain.*—This organ was examined in only five of the cases. The subarachnoid effusion was either entirely wanting, or moderate, except in one case, where there was a considerable quantity of reddish serum. In the same case the ventricles contained an ounce of bloody serum, whilst in two of the others they were empty, in a third nearly so, and in the fourth contained scarcely a drachm of fluid. In one the walls of the ventricles were of a yellow color. The pia mater was deeply injected in one case, in which also there appeared to be a slight effusion of blood into the cells in a small circumscribed space; its veins much distended posteriorly in another. The cortical substance was of a deep shade in two cases, and in none is it mentioned as being paler than natural or presenting other alteration. In two cases the medullary substance was natural; in a third it felt pasty without giving the sensation of softness; while in a fourth it was soft and pasty, being at the same time dry and of a milk-white color, with few bloody points. In a fifth its color was a dirty white, mixed with a faint reddish brown, its consistence natural, with the exception of slight central softening. The same condition was presented by the cerebellum, which was natural in three other cases; its condition not noted in the fifth.

"The above alterations are similar to those found in other acute diseases, and must be regarded as slight and comparatively unimportant, if we except the individual in whom there was large bloody effusion in the ventricles, etc., and whose case will be reported further on.

"*Respiratory Apparatus — Pleura.* — Old adhesions were found in a few cases, but very limited in extent. In two instances there was effusion in each pleural cavity, of about half a pint of a reddish brown or bloody fluid. In both of these cases the heart was flaccid, its lining membrane deep red or reddish brown, and in one the pericardium also contained several ounces of bloody serum. The lungs, on the contrary, in one of these cases, were healthy, in the other, very dark, deeply congested, without hepatization. It is most likely, then, that the pleural effusion was the result rather of an altered condition of the blood, combined, perhaps, with some softening of the tissue, than upon obstruction to the pulmonary circulation. That pleural effusion was generally absent or slight in the other cases, I have little doubt, but its absence is not positively noted.

"*Lungs.*—Of the six cases in which these organs are particularly described, hepatization was found in one case only, and that at the summit merely of the middle lobe. They were generally more or less supple and crepitant, sometimes dark posteriorly; in one instance yellowish in the upper lobes, but deep reddish brown in the lower, in which case also spumous fluid

* American Journal of the Medical Sciences, for 1861 and 1862.

of corresponding color, but most abundant in the lower lobes, issued from the several parts when squeezed. Indeed these organs presented nothing particularly remarkable, except in one instance (Case III.), where they were highly congested, their color throughout nearly their whole extent being very dark, almost black, and the tissue but slightly crepitant, though not granulated or very easily penetrated.

"The condition of the lungs, then, was much the same as in most other acute diseases, not especially seated in these organs. It is worthy of remark, that in no instance were there any of those hæmorrhagic masses frequently occurring in the yellow fever, according to the description given us by M. Louis, while, in both, hepatization was very rare.

"*Circulatory Organs.*—The pericardium contained a small quantity of serum in one case, and several ounces of bloody serum in another.

"*Heart.*—This organ was flabby in three of the six cases in which it is particularly described, and combined with this flabbiness, there was diminished consistence at least in two cases. In the same three cases its lining membrane was reddish brown, deep red, or violet; in two of these the coloring being deepest on the right side and in the neighborhood of the valves, and extending into the pulmonary artery and aorta. In the other three cases the heart presented nothing remarkable; in all, its valves were supple, and in one case of a yellow color. The aorta was of a bright or lemon yellow in two cases.

"In the five cases in which the state of the blood is mentioned, this fluid was found in the cavity of the heart. In one case there were black coagula mixed with red serum; in the others fibrinous coagula, soft in two, semi-transparent and greenish in another, and generally small. No large, firm, fibrinous coagulum was found in a single instance. Although it is impossible to say, at present, whether or no blood in remittent fever presents any characters which are absolutely peculiar, it is perfectly evident that it is the seat of morbid changes which deserve especial attention.

"*Abdomen.*—A few ounces of a bistre-colored fluid were found in the peritoneal cavity in one case; in another, a part of the peritoneal coat of the gall-bladder, and of the neighboring folds of the small intestine were of a rose color, and covered with false membrane. The omentum, and many of the folds of the small intestine, are noted in one case as olive-colored, there being no effusion in the cavity; in another, the intestines were of a dingy ash color, and pasty feel.

"*Liver.*—Enlarged in three cases, and in one of them to a great degree; in the others it was of natural or moderate size. The consistence of the organ appears to have been generally diminished, being flabby, or softened, or both, in four cases, a little soft in a fifth, and moderately firm, but still readily penetrated by the finger, in a sixth; in the seventh, the consistence is not mentioned.

"The color was nearly the same in every case, but very different from

natural. In most of the cases the liver is described as being of the color of bronze, or a mixture of bronze and olive; in one as a dull lead color externally, internally bronzed with a reddish shade; in another as between a brown and an olive, the latter predominating; and finally, as a pale slightly greenish lead color, with a tinge of brown, in one instance. Few things are more difficult than a description of color. The most correct idea of that before us would perhaps be conveyed by stating its predominant character, the same in every case, to be a mixture of gray and olive, the natural reddish brown being entirely extinct, or only faintly to be traced. This alteration existed uniformly or nearly so throughout the whole extent of the organ, except in a single instance, where a part of the left lobe was of the natural reddish brown hue. As the alteration of color pervaded both substances, the two were frequently blended together, and the aspect of the cut surface remarkably uniform. In one case, however, there was a marked distinction of color, the olive being predominant in the parenchyma, the brown in the acini. Of the four cases in which these characters are mentioned, the cut surface is described as smooth in three, of a shagreened appearance, and rough in the left lobe, in the fourth. This last character was evidently dependent upon hypertrophy of the lighter colored substance, which existed also in another instance, both cases, however, being examples of a very protracted form of the disease.

"The nature of the lesion of the liver above described, characterized essentially by a peculiar alteration of color, is not easily determined. That it is the result of inflammation will hardly be contended, and even if attended with congestion (which I think very doubtful), this could not account for it, as congestion is frequently present in other diseases where no such alteration of color is observable, and where, on the contrary, its effect is to produce a deeper red. Some, perhaps, will look upon it as dependent upon the infiltration of bile into the tissue of the organ, but still it will at once be perceived that this presupposes a peculiar alteration of the bile and liver, inasmuch as the appearance presented is not found in other diseases, at least so far as I am aware. In saying that this lesion is found in no other disease, I wish to be understood as excepting those cases of pernicious and other intermittents, which prove fatal in the early stage, or before giving rise to well-developed cirrhosis, abdominal effusion, etc. Indeed, I think it highly probable that the same alteration of the liver will be found to exist in intermittents which thus prove fatal; an opinion confirmed by the case last detailed. In speaking, therefore, of this alteration being peculiar to remittent fever, I wish to be distinctly understood as not excluding intermittent fever, which, in my opinion, is essentially the same disease.

"The lesion in question, then, being peculiar to the disease before us, and the only one which is so (all the other lesions being common to it and other diseases), and at the same time being found, as already observed, in every case, we are obliged to admit that it constitutes its essential anatomical

characteristic, or at least that such is the conclusion to be derived from the cases before us. Their number, I am aware, is insufficient to establish such a point conclusively, and it therefore remains for future observers to determine whether or no the lesion we have described belongs to the disease under all circumstances. That such will be found to be the case, I confess, seems to me very probable, when I recollect that the cases we have been examining were distributed over three successive seasons, and originated, not in a single locality, but in different and widely separated places, and also that by a reference to the description of authors, it is apparent that a similar condition of the liver has been frequently observed by them, without, however, attracting that attention which it seems to me it demands.

"Whatever may be the results of future observation in reference to the constant occurrrence of this lesion, and even if the conclusion to which I have arrived, that it constitutes the *essential* anatomical characteristic of remittent fever, be found erroneous, owing to its absence in a certain portion of cases, it is still worthy of attention. It certainly constitutes a most peculiar and important anatomical feature of the disease. Its connexion with certain symptoms during the early and middle period of the disease, its tendency to pass into cirrhosis in protracted cases, and thus lay the foundation of certain chronic organic alterations, abdominal effusion, etc., and the assistance it must afford in determining in fatal cases the diagnosis between remittent and other fevers, are sufficient to convince us of its claims upon our attention. The striking difference between it and the alteration of the liver which belongs to yellow fever is particularly interesting, especially as it was found quite as strongly marked in the case which most nearly approached to the latter disease, as in any of the others. While in remittent the liver is of a dull bronze or between a gray and olive, in yellow fever it is pale and of various shades of yellow, as straw-yellow, gum-yellow, etc. In typhoid fever the liver appears to present no other change of color than what arises from an increase or diminution of the red tint, being sometimes of a darker red, at others paler than natural."

After Doctor Stewardson, Doctor Powers made a number of autopsic observations, on the same fever, in the Baltimore Almshouse. He found the spleen, in every case, enlarged and softened. The liver was, generally, large, soft, and friable; but not in a state of congestion. Its color, in different cases, was grayish bronze, slaty bronze, and dark slaty gray.

Doctor Swett has since extended these researches, in the New York Hospital.* His cases, five in number, were from the South and West; but not, in general, as well marked as those of Doctor Stewardson. The brain, in most of the subjects, was healthy, although they had delirium and coma during life; the heart was either natural, or flabby and softened; in two cases the lungs showed signs of pneumonia; and taking the whole of the cases together, he found more decided evidence of inflammatory action in

* American Journal, Medical Sciences, for January, 1845.

them than any other organ. Referring to the stress, which Doctor Stewardson had laid on the pathological condition of the stomach and bowels, as suggesting that mucous inflammation is an important and frequent feature of the Fever, Doctor Swett remarks—"I am unable to confirm this opinion. Most of the changes that I have observed in the mucous membrane of the stomach, have appeared to me of a chronic nature; and probably long antecedent to, and entirely independent of the acute disease. I refer, particularly, to the thickened and mammillated condition of the organ. The injection of the mucous membrane, although present in all the cases to a certain extent, did not appear to me, beyond what is commonly noticed in other acute diseases, and might, in some cases at least, be referred distinctly to simple post-mortem venous congestion. The symptoms during life, appear to me to strengthen this idea. The patients very seldom complained of pain in the region of the stomach, and although slight tenderness on pressure was frequently noticed, yet this did not exceed, I think, what is noticed with equal frequency, in other febrile affections."

Dr. Stewardson, also remarks, that traces of inflammation exist on the mucous membrane of the duodenum, and notices particularly, an enlarged condition of the mucous follicles. This view, also, I have been unable to confirm." . . . "The mucous membrane of the intestinal canal, excluding the evidences of chronic disease, or of disease that had probably for a long time ceased to exist, was found healthy. The symptoms during life confirmed this opinion. The absence of diarrhœa, of abdominal pain, and tenderness, of tympanitis, the ease, and even the feeling of relief with which purgatives acted, all go to prove the absence of at least inflammation in those important organs."

In every subject, the spleen was more or less enlarged, and engorged—in some softened. The state of the liver will be best given in his own words.

"It will be perceived that, in the five cases above detailed, the peculiar condition of the *liver*, which Dr. Stewardson has assumed as the *anatomical characteristic* of remittent fever, was uniformly found." . . . "Two important considerations naturally present themselves here. *First*, what is the nature of this condition of the liver? The only positive change that I have been able to observe, is that of color—the slaty and bronze tint externally, the olive tint internally. It is true that a slight degree of softening of the tissues seems to exist, in connexion with this change of color, but this has, in all my cases, been very moderate in degree, and, in one of the best marked cases of the disease, extremely doubtful. All will admit, I think, who have examined such cases, that there is no evidence of inflammation in the changes noticed, for although some degree of capillary injection existed in two of the cases, yet in the remaining three it was entirely absent. The natural size of the liver, the absence of lymph or pus, the small quantity of blood yielded by pressure, as well as the local symptoms during life, especially the absence of pain and tenderness over the region of the liver, tend to

confirm the same idea. It appears to me not an unreasonable conclusion, to suppose that the change of color is produced by the action of the bile, especially, when we remember the appearance of this secretion as observed in the gall-bladder.

"Another important fact to establish is, whether this appearance of the liver may not be found in other diseases, and particularly in other forms of fever. This question can only be settled by long and multiplied observation. I can only say that, in six fatal cases of continued fever, four of which originated on shipboard, and two in this city, no such condition was found, and that, after careful examination with this object in view."

My own occasional autopsies have afforded results, which correspond very well with those which have been detailed; but I must confess that my attention was not attracted to the *peculiar* color of the liver, first distinctly pointed out, I believe, by Dr. Stewardson; though a modification of color in that organ had often been mentioned before. Dr. Swett has intimated, that such a change might be looked for, in the organ which secretes the bile. We know, that green discharges are not uncommon, and a bluish fluid is occasionally ejected. Dr. Hollingsworth, of Mississippi, has communicated to me a case, in which for many days, the patient continued to have copious evacuations of that hue. As the febrile action in this fever is of a peculiar kind, it is reasonable to suppose that the organ charged with forming the yellow coloring matter of the bile, may produce a tint of a different kind. Thus, the change of complexion, does not necessarily, require us to infer a structural lesion of the liver. In fact, apart from the altered hue, the liver is, apparently, much less affected than the spleen. Another evidence, that it is not always deeply implicated, is to be found in the fact, that during many remittents, there are daily discharges of healthy-looking, yellow bile; and, that, during convalescence, the organ generally acts very well; finally, that fewer hepatic, than splenic diseases, follow on the Fever. The results which have been recounted, show that the spleen is, generally, if not always, involved; and the mucous membrane of the stomach and bowels very frequently.

But the admitted ravages of inflammation are neither constant nor striking: not sufficient, I think, in most instances, to account for the death of the patient; unless we include among them all cases of congestion and softening, which would certainly be gratuitous. Passive hyperæmia is an unquestionable pathological fact; and fever softens every tissue of the body. To the latter type of morbid action, we may refer the soft and flabby state of the heart, not less than of the liver, spleen, and mucous membrane of the stomach and duodenum. In a case communicated to Doctor Stewardson, by Doctor Howland, of Baltimore, the spleen did not bear lifting, any better than a clot of drawn blood bears it; and many others have observed the same phenomenon; which indicates a decomposition of the vascular and fibrous tissues of the organ. The soft and pulpy state of the mucous mem-

brane, with but little appearance of hyperæmia, is doubtless of a febrile, rather than phlogistic origin. In a post-mortem examination by Dr. Harper, which I attended, at the Vicksburg Hospital, in 1844, the mucous membrane of the stomach was soft, tender, thickened, and easily detached; but there was only here and there a spot of hyperæmia. It is worthy of remark, that the duodenum in this case was sound.

We may, on the whole, conclude, that although more or less inflammation arises, perhaps in every severe and protracted case of this fever, and may often be the cause of death, it is not necessary to the *existence* of the Fever; which in many cases proves fatal, independently of the lesions, which in others it produces.

SECTION V.

CONSEQUENCES OF AUTUMNAL FEVER.

I. CHRONIC ACTION OF THE CAUSE OF AUTUMNAL FEVER.—This seems to be a suitable place in which to inquire, whether the cause of autumnal fever can act upon the system, to the production of morbid conditions, other than the Fever itself. There are etiological agents, as the variolous poison, which either produce no effect, or occasion a full development of the disease; there are others, equally specific, as that of epidemic cholera, which affect the system with every grade of violence, from the slightest diarrhœa, to mortal collapse; finally, there are others still, as vicissitudes of weather, which produce in one person catarrh, in a second, tonsillitis, in a third, rheumatism, in a fourth, a fit of dyspepsia. There is, then, no objection, *à priori*, to the opinion, that the cause of autumnal fever may exert injurious influences of a lower grade, and a different kind, from that Fever. Whether such be the fact, can only be known by observation.

That the agent we are now considering, can act in a gradual and feeble manner, to the end of slowly developing intermittent maladies of a mild character, is what I can testify; and as the consequences of autumnal fever, as found in different parts of the body, we may, I think, conclude, that the slow and insidious operation of the noxious agent may generate various diseases, or at least, diatheses and predispositions to them. But for the full illustration of this subject, a more ample store of facts than I possess, is required.

Over most of the Interior Valley, a ruddy complexion is rare, and often replaced by a slight turbid hue, or a tinge of sallowness. When standing before the medical classes of Lexington, Louisville, and Cincinnati, composed chiefly of young men between twenty and thirty years of age, I have seen very few with plump and rosy cheeks. In general, the malar bones appear prominent, from defective cellular development of the cheeks. These deficiencies exist in various degrees; and are greatest among the people in

what are called malarial districts. When we mingle with them, we see conclusive evidence that their physiology is not sound, although they may regard themselves as in health. Those of the worst aspect, have generally experienced one or more attacks of fever, which have left them infirm; but others have never suffered from that disease, and yet they are not vigorous, in appearance or reality. They who have constantly breathed the atmosphere of such localities, and have suffered attacks of fever while young, are often stunted in their growth, and never reach the port or portraiture of perfect manhood. But before we ascribe these effects to an empoisoned atmosphere, only, we must recollect that heat and moisture generally prevail in such localities; and grant, that an undefinable portion of the injury should be attributed to them.

If we admit the reality of what has been set forth, and connect with it a periscope of the Valley, but recently become the abode of civilized man—as yet, in its oldest settled portions, but in the transition state—many parts abounding in swamps, others intersected with alluvial streams, and almost everywhere overshadowed with forests, we may presume, that a national physiology, with its peculiar infirmities and predispositions, is, or must, necessarily be the consequence. This, if I mistake not, is actually the case at the present time; and constitutes a reason why bloodletting and other active evacuations are not borne as well by those who live in low paludal districts, as those who inhabit higher and drier localities. In the former, many diseases, not inherently periodical, display more or less of that type; evincing that the constitutions of the inhabitants have been acted upon by the cause of autumnal fever.

II. But we must inquire whether the people in such places are liable to any *actual* diseases, periodical fevers excepted, which may be regarded as the products of the conditions under which they live.

Comparing the early and the latter frequency of biliary derangements, in the same localities, it seems to me, that with the progress of cultivation, and the density of population, the present has a decided advantage over the past; and a comparison of country and city, leads to the same conclusion. In former times, I have witnessed, more than once, an epidemic jaundice, in autumn, which it appeared natural to refer to the cause which produced fever, in that season. Dyspepsia has, also, seemed in many cases, to be the offspring of the same agency. Chronic, or subacute hepatitis, I am almost convinced, has often been generated by the same agencies; and it is an admitted fact that the spleen may become enlarged in these localities, without the previous occurrence of a single paroxysm of fever.

Finally, not to press a debatable principle to its utmost limits, I will only add, that neuralgias, and many irritations and oppressions of the brain and nervous system, unattended with pain, appear to be insidiously generated by the same influence; in illustration of which I may introduce the

following statement, made out from *memoranda* handed me by a gentleman in this city.

Mr. N. L., who had, for many years, resided in the eastern part of the city, near the junction of Deer Creek with the Ohio River, and, consequently, in what is called a malarial atmosphere; became affected with dyspepsia, from which he had been exempt through the earlier period of life, when that disease generally occurs. His feelings became depressed and irritable, his strength declined, and he gradually lost much of his flesh. At length, under a full and nutritious diet, and the daily use of wine or brandy, these symptoms were removed; and he recovered his cheerfulness, strength, and flesh. Some time afterward, however, he began occasionally, to experience, in the night, the premonitory feelings of a paroxysm of dyspepsia, succeeded in the morning, by vertigo, and a momentary loss of consciousness, followed by transient perspiration. These fits usually returned several times for a day or two, when a slight diarrhœa would supervene, and terminate the attack. After seven or eight months, it struck him that the disorder had been recurring at regular periods; whereupon he determined to record the times of future returns, and soon found the periods to be, invariably, of thirty days. Becoming familiarized to them, and being a man of talents, and observation, he noted, that every paroxysm was ushered in by a peculiar vision of the mind, so that, at length, he would exclaim, 'there is the same strange idea,' but the instant it was gone, 'he never could have the least recollection of what it was.' This continued for more than a year. Medicines then checked the paroxysms for one or two monthly periods, when it recurred, as severe as before every twenty-one days, and continued at that rate, for five or six months; when, under the use of medicines, the recurrence came to be on the sixteenth day, the violence of the fit remaining the same. Throughout the second night after the access of the paroxysm, he would invariably lie awake, but was calm in mind, and without fever. For more than two years, he continued to note the recurrences of the fit, and found them constantly on the sixteenth day. During that period, as soon as the paroxysm was gone, he felt well, and his mind was clear and active; but gradually, it became so enfeebled and gloomy, that he made no further records. After about five years the fits began to abate in violence; and to become irregular in recurrence, sometimes not returning for six weeks. At the present time, when he is sixty-five years of age, they still recur, but with great mitigation. He is never kept awake through the night, nor does he any longer lose his consciousness. His health, is otherwise good, and no impairment of memory or intellect seems to have been produced.

III. Consequences of Autumnal Fever.—The reader will perceive, that a distinction is made between the lowly developed effects of the agent which produces autumnal fever, and the morbid states or consequences which follow it. As an illustrative contrast, I may anticipate what must

be repeated hereafter, and say, that yellow fever, even when not skilfully treated, leaves but few vestiges behind. Death, or sound, even improved, health, is the fate or fortune of the patient. It is far different with the subject of autumnal fever. When combated with skill, in its early stages, his recovery, it is true, may be perfect, and this in mild remittents, may be the case, if no medical aid be administered; but no fact is better established than that many cases are followed by consequences, from which patients slowly recover, or finally die. Some of these lesions are found in the innervation; and manifest themselves as neuralgias in various parts of the body; others exist in the blood, which remains impoverished; others in the exhalent and absorbent vessels, generating dropsies; others in the stomach and bowels, originating dyspepsia, diarrhœa, or constipation; others in the liver, which may remain torpid or inflamed, with an attendant jaundice; lastly, others in the spleen, left inflamed or enlarged and softened. These various secondary and tertiary lesions, must be studied, to complete the pathological and therapeutic history of the Fever; and to them we must now give attention, beginning with the most frequent and formidable,—the disorders of the spleen.

CHAPTER XI.

CONSEQUENCES OF AUTUMNAL FEVER.

SECTION I.

DISEASES OF THE SPLEEN—GENERAL VIEWS.

I. It is, I think, an unquestionable fact, that a vast majority of the people of this country, if not of our race, live and die, without experiencing any disease of the organ we are now considering. Abuses of diet, which carry a morbid condition into the alimentary canal, liver, kidneys, heart, and brain, do not, as far as we know, often disturb the spleen. Alcoholic potations, which light up inflammations in the same organs, and above all in the liver, leave the spleen unaffected. Vicissitudes of temperature, which inflame all the pulmonary tissues, the peritoneum, and the joints, are not known to occasion splenitis. All the viscera enumerated, may, moreover, be inflamed, or otherwise diseased, without necessarily carrying into this deeply caverned, and unsocial organ, any recognised, sympathetic disturbance.

This exemption, from the sinister influence of many external and pathological causes, may, perhaps, be ascribed, in part at least, to the following causes:—

1. The organ is placed more beyond the influence of external agents than

any other abdominal viscus, except the pancreas; which, at the same time, it may be remarked, is still more exempt from disease than the spleen. The spleen is also more secluded from outward influences, than the lungs, heart, and brain.

2. Its tissues are few and simple, consisting chiefly, of arteries, veins, a fibrous, or cellulo-fibrous membrane, containing a red pulpy matter, and an external fibro-serous tunic. Now the simpler the structure of an organ, *cæteris paribus*, the fewer are its diseases.

3. The few nerves which enter it, upon the vessels, are derived from the system of the great sympathetic, and do not bestow on it much animal sensibility; nor establish between it and the other organs of the body any lively sympathy.

4. Compared with most of the organs, its function is, manifestly, more simple than theirs. What that function is, we do not know; but it is, evidently, limited to the blood; which it is either designed to receive and retain, from the other organs in certain excited states of the circulation, as suggested long since by Dr. Rush; or it works out some change in the constitution of that fluid, or both; functions, especially the former, requiring far less complication of structure, than the office of the liver, lungs, or brain.

II. I shall not stop to inquire into the relative influence of these different anatomical and physiological reasons for the comparative exemption of this organ from original disease; but proceed to remark, that while this exemption is a fact, that must be admitted, there are three forms of fever which carry disease into that organ. I say *three* forms, for all fevers do not. Thus, most or all of the phlegmasiæ, may run on with extreme violence for many days, or in a subacute grade, for weeks, without occasioning disorder of the spleen; while on the other hand, two of the forms of fever to which I allude, very often, and the third, almost constantly, affect it; they are yellow, typhus, and autumnal fever.

1. Dissections have shown, that the spleen is sometimes enlarged and softened in yellow fever, but these lesions are not even so frequent as in typhus and autumnal fever.

2. The typhoid fever of the French writers occasions derangement of the spleen, as one of its most common characteristics. They are not generally known, however, during life, though sufficiently manifest after death. They have not only been observed in Paris, but in various parts of the United States. They consist of enlargement and softening, without, in most cases, many of the more common and certain signs of inflammation; neither pus being found within, nor coagulating lymph without the organ. The variety of fever, properly denominated typhus, also presents us, in fatal cases, with lesions of the spleen, though less frequently, and strikingly, than the typhoid.

It is worthy of remark, that yellow and typhus fevers, do not, in cases of

recovery, leave behind them, as consequences, either splenitis or enlargement of the organ; showing that they affect it differently from autumnal fever. I have never yet seen an enlarged spleen, following on any form of typhus. There is nothing then, to be said as to the treatment of diseases of the spleen, consequent on these continued fevers.

3. The great source of diseases of the spleen, in this country, is well known to be autumnal fever. In the present state of our knowledge, it would, perhaps, be most proper to content ourselves with the knowledge of this connexion, as a fact, and not attempt to speculate upon it. Nevertheless, it can do no harm to review the suggestions which have been made, if we do not rest any treatment upon a mere hypothesis.

a. It has been conjectured, that autumnal fever commences in the spleen; whence a morbid action spreads itself throughout the organism. But if this were the case, we ought to find that organ diseased *before* any other; which, as far as we can judge by symptoms, is not the case. As remittent fever, moreover, is generally more violent and dangerous than intermittent, the signs of disease in the spleen should be more decided in the former than the latter; which we all know is precisely the reverse of the fact. Finally, the manifestations of splenic disease, are often greatest on the decline of the Fever, which is directly opposed to what should be the case, if the Fever arose from the disease of that organ.

b. It has been conjectured, that in these fevers, the spleen becomes involved, during the cold stage, from a recess of the blood from the exterior parts of the body, and its accumulation in the portal circle. Such a destruction of the equilibrium of the circulation, must be admitted as a pathological fact; and that it is the cause of the disorders of that organ, may be inferred from another fact, which is, that remittents, in which the cold stage is less violent and protracted than in intermittents, disorder the spleen much less than the latter. On the other hand, however, typhoid fever injures the spleen frequently and seriously, although it be a continued fever; and, of course, is exempt from those periodical revulsions, which characterize intermittents; and hectic fever, attended with protracted diurnal chilliness, continues for a long time, without occasioning disease of the spleen.

c. A third hypothesis, is, that malaria, or whatever may be the remote cause of autumnal fever, has a specific tendency to act on the spleen; just as the remote cause of typhoid fever directs its influence on the glands of Peyer, and the remote cause of plague, on the ganglia and other organs of the axilla and groin. I think it can scarcely be doubted, that this is a reality. For, *First.* The great frequency of splenic disorders in autumnal fever, would seem to prove it. *Second.* The influence of the sulphate of quinine, in removing some of them, looks to the same conclusion. *Third.* In paludal districts, the spleen sometimes becomes disordered, by the slow or feeble action of some agent, the individual never having had an attack of either intermittent or remittent fever.

d. It is well known, that diseases of the spleen are almost incurable while the individual continues to reside in the locality which generated them; but are curable, and sometimes spontaneously cease, when he seeks a more salubrious residence.

On the whole, we may, perhaps, combine two of these hypotheses and say, that the spleen is not only engorged during the cold stage, but that it is the nature of the remote cause of autumnal fever, to determine a morbid influence on that organ, more than any other; and hence the frequency of its disorders in autumnal fever. We must not, however, lose sight of the fact, that we are entirely ignorant of the function, which is performed by or in the red pulpy matter of the spleen; that we know nothing of the relations which it bears to the blood; nor of the influence of the remote cause upon the blood; and, therefore, that the disorders of the organ may, possibly, be induced through those humoral elements.

In persons of strumous habit, the spleen is apt, like almost every other organ, to become the seat of tubercle; but passing this by, we may say, that almost every case of disease of that viscus, known to us in this country, grows out of autumnal fever; and, in what I shall say through the remainder of this section, I propose to limit myself to its disorders consequent on that fever, most of which, moreover, connect themselves with the intermittent form.

III. Simple intermittents, if protracted, scarcely ever fail to disorder the spleen. Such disorder at first shows but few signs of an inflammatory character, presenting nothing but enlargement; but, in the succeeding winter, under vicissitudes of temperature, inflammation may be superadded. Of the true nature of this simple enlargement, we know nothing very positively; but it must consist, I think, either in an increase of the peculiar pulpy matter of the organ, with increased development of the fibrous structure; or the accumulation and stasis of the blood, or both. To the former, only, should the term hypertrophy be applied. The latter is a species of permanent erection, and I presume it is by far the more common of the two. I once supposed it might sometimes be a hydropic condition of the organ, or a secretion of serum into the cells of the spleen, where it would be colored by the red pulpy matter; but can cite no facts in support of this conjecture.

During the paroxysms of a malignant intermittent this organ suffers severely. This is proved by two facts. *First.* Those who recover are often left with enlargement of the spleen, although they might have had but two or three paroxysms. *Second.* The organ in those who die, is almost always found more or less swollen, greatly softened, and sometimes almost diffluent; but it rarely exhibits any acknowledged vestiges of inflammation.

Inflammatory intermittents generate most of the cases of splenitis with which we meet. This inflammation may be accompanied by manifest swelling of the organ, or exist without it—it may, again, be either serous or parenchymatous. It may invest the organ with bands of lymph; or fill it

with factitious tissue, thereby hardening it; may soften it in the absence of such tissue; or may end in suppuration. It may manifest itself, during the Fever, as a decided complication, and cease with it; or, escaping observation in the midst of the general overthrow of the functions, may attract our attention, for the first time, when the patient has begun to convalesce. In whatever stage of the Fever, or the convalescence, it may be developed, its diagnosis is essentially the same. This, when enlargement and inflammation are combined, is comparatively easy; but when inflammation exists without enlargement, the diagnostic difficulty is sometimes considerable.

We come now to consider the symptoms and treatment of splenitis.

SECTION II.

SPLENITIS.

I. Symptoms.—These, as they occur during an attack of inflammatory intermittent fever, have been stated on *page* 66, *Vol. II.*, and therefore, a brief recognition will, now, be all that is necessary. The characteristic symptoms are pain, not often very acute, in the left hypochondrium; tenderness or soreness on pressure, over the intercostal spaces, or below and behind the cartilages of the ribs; frequently, a hacking cough; a sense of oppression and anguish in the region of the diaphragm; sometimes a hiccup—two examples of which were mentioned to me, as occurring in their practice, by Drs. Henry and Merriman, of Illinois; in violent cases, a pain in the left shoulder, of which, Professor Gross* has met with one example; and I have myself seen two or three; finally, more or less fever, according to the degree of inflammation. To complete the diagnosis, the absence of several symptoms, must be noted. The stomach and bowels are much less affected in splenitis, than in hepatitis; there is no expectoration, and the respiratory murmur, can be heard over the splenic region; but when the organ is enlarged, which is almost invariably the case, there is a dull sound under percussion; finally, the patient can lie on the opposite side, much better than in hepatitis.

II. Morbid Anatomy.—Splenitis may be either capsular or parenchymatous. I know of no distinguishing symptoms; but, from analogy, we may presume, that the former variety is accompanied by greater pain and tenderness, than the latter. The effect of the first, is to throw out coagulable lymph; which more or less invests the organ, producing, by its contraction, deformity and, sometimes, atrophy of that organ, examples of which I have seen in the Louisville Hospital. The effect of the second, in some cases, is induration of the organ from infiltrations of lymph; in others, softening, or suppuration.

Occasionally, the spleen becomes adherent to the diaphragm; the inflam-

* Pathological Anatomy, Second Edition, p. 677.

mation may then permeate the latter, and enter the pleura and lungs, which will attach themselves to it above. Thus, splenitis, diaphragmitis, pleurisy, and pneumonia, may finally co-exist; and, if the physician should not be called till the last is established, he might pronounce it the only disease. This extension of the inflammation to the diaphragm, explains the production of cough and hiccup, in splenitis; and affords a beautiful example of the influence of an inflamed surface, in exciting its own morbid condition in another surface, with which it is in contact.

III. Exciting Causes.—The cases of splenitis now under consideration, are those which follow on autumnal fever, especially inflammatory intermittents. Beginning in the early stages, the inflammation may survive the cessation of that fever; but in other cases, the organ is only brought into a state of sanguineous engorgement by the Fever, and the inflammation is awakened by an exciting cause. This is generally one of those sudden changes of weather, which are so frequent in our middle and higher latitudes, where it is more common than in the South. Being thus awakened, it generally occurs late in autumn, and through the following winter. But violent exercise may start the inflammation, when the organ is in a state of congestion. Lastly, an accidental blow or a fall, on the left side, may bring out the same result.

IV. Treatment.—The fever which accompanies splenitis, very commonly displays a remitting type; and this paroxysmal character has often restrained the physician from active antiphlogistic measures, when they were imperatively demanded. In our warmer climates it may not be admissible, in most cases, to employ the lancet; but, in the cold and variable, venesection is indispensable; the blood is sizy, and much relief follows its detraction. A case in the Commercial Hospital, of this city, during the present winter, required no less than four bleedings, after each of which the symptoms were mitigated; and the swelling of the organ, which was so great as to cause a bulging out of the cartilages of the ribs, was, also, diminished by every operation. In mild cases, and especially, when the constitution is much broken down, cupping over and below the ribs, may answer the end proposed by the loss of blood; after which the counter-irritation of a large blister will be useful. In acute cases, calomel, in two-grain doses, may be given every two hours, for a few days, the bowels having been previously evacuated, or, in its stead, active cholagogue and hydragogue purging may be effected by the compound power of jalap, infusion of senna with sulphate of magnesia, or pills, composed of calomel or blue mass, compound extract of colocynth, and squill, in equal parts. In the South, however, and, in very paludal localities further north, these medicines must be administered with some reserve. At a comparatively early period, the sulphate of quinine is demanded. At first it should be given in combination with nitrate of potash or muriate of ammonia, in the proportion of five grains of the former to fifteen of the latter; but, as the inflammation declines,

opium, in the quantity of half a grain or a grain, may be substituted for the latter, under which treatment the swelling and inflammation will, in general, rapidly abate.

Subacute splenitis is often attended with fever, and the local symptoms are such as to suggest a mild inflammation. Such cases do not require the lancet, but cupping will always be proper. As to the remainder of the treatment, it should be a diminutive of that for the acute form.

SECTION III.

SUPPURATION OF THE SPLEEN.

PARENCHYMATOUS splenitis frequently terminates in suppuration. A want of acute sensibility in the interior structure of the organ prevents a degree of pain sufficient to alarm either the patient or the physician; and, in many cases, the fever is inconsiderable, and hence the inflammation is left to pursue its course. I once supposed hepatic abscesses commoner than splenic; but more extensive inquiries have shown me the reverse. In my intercourse with physicians, I have collected the following facts:—

Dr. Flournoy, of Lexington, Missouri, has met with two cases. The pus was discharged into the bowels. In one, when the patient continued in a recumbent posture for some time, a swelling in the direction of the left hypochondrium would manifest itself; on pressing which, the flow of pus into the bowels could be heard; and, in a few minutes afterward, there would be a discharge, *per anum*, of that fluid—the tumor having disappeared. The patient seemed every way convalescent, when, from indulging in a large meal of meat; fever and "colicky pains" supervened, and he died in two days. A hasty post-mortem inspection showed, in place of the organ, only a small sac; the aperture from which into the bowel, no doubt the colon, was not found.

The other case was marked by *this* peculiarity. A tumor formed; a discharge of pus took place from the bowels, and the swelling abated; the discharge from the bowels ceased, the swelling rose higher than before, pointed externally, was opened with the lancet, and several ounces of pus escaped, after which recovery took place.

Dr. Twyman, of St. Charles, in the same State, has seen two cases of splenic suppuration. One occurred in a child, three years old, and the discharge was into the bowels. In the other case, the abscess pointed externally, and was opened below the cartilages of the ribs—both recovered. The Doctor has been informed of another in the neighborhood of St. Charles, which terminated in the same manner with the last.

The following case was given me by Dr. Henry, of Springfield, Illinois. Although the subject of it lived in a region where autumnal fever abounds, he was not known to have had that disease. He was a robust man, who

had been subject for several years, to attacks of what was called colic; when in the winter of 1842–3, immediately after one of them a painful swelling rose rapidly in the left hypochondrium for which his physician bled him once, and purged him. The cathartic operated kindly but afforded no relief. After a while, Dr. H. was called in and found the left side of the abdomen much enlarged, and both sides tense and tender. A fluctuation was obscurely perceptible on the splenic side, and the attending physician was treating him for ascites. He had a considerable degree of dyspnœa, a dry hacking cough, and would 'hiccup by the hour.' His stomach had been irritable, but was not so at that time. Every morning, he had a slight chill, for which his physician had administered sulphate of quinine. Dr. H. did not advise any active treatment, but rather to wait and watch the progress of the disease. In a month, a sudden and copious discharge of pus and blood, came on from the bowels, with subsidence of the swelling; and a perfect recovery followed.

Dr. Boone, now of Chicago, Illinois, saw, at Hillsboro', in that State, a case of splenic abscess following an intermittent fever, which pointed externally, was opened, and the patient recovered.

Dr. Christian, of Memphis, Tennessee, met with a case, preceded by intermittent fever, in which the organ was greatly enlarged, and an abscess pointed in a mammary form on the left side of the navel. It opened spontaneously, and discharged, at least, two quarts of pus, after which the patient recovered.

Dr. Shanks, of the same city, saw two cases, in which an accidental blow given to the spleen, when enlarged from intermittent fever, brought on suppurative action, with a discharge of pus by the bowels. Both the patients died; but no post-mortem inspection was made.

Dr. Frazier, of the same place, related the following: A river-man, who had been often affected with intermittent fever, suffered an injury of the ankle, which rendered amputation necessary. Two weeks after the operation, he died. On examination of the body, an abscess of the spleen, without any enlargement of the organ, was found. The character of this case is ambiguous, and the pus might have been, and probably was, absorbed from the stump and deposited in the spleen—an example of the cold abscess, of the surgeons.

Of these eleven cases, the discharge of pus in six, was by the bowels; in three externally; in one by both modes; and in one no evacuation took place.

It deserves remark, that none of the abscesses made their way into the stomach, peritoneal cavity, or lungs. It should likewise be noted, that the discharge of pus was not followed by hectic fever; and that all the patients recovered except one, who fell a victim to the indulgence of his appetite during convalescence; and two, who had suffered external injury. Lastly, all the cases occurred north of the thirty-fifth degree, and most of them

above the thirty-eighth. Not one case was mentioned to me south of the former parallel of latitude; and hence, we may conclude, that suppuration of the spleen is a northern rather than southern disease; we are also admonished, by the issue of two cases, that those who have enlargement of the organ, are in danger from mechanical injuries.

The treatment of suppuration of the spleen, after the discharge of pus has commenced, must, of course, be restorative, and consist of nutritious diet (all inordinate indulgences being avoided); the bark, rendered still more necessary than in ordinary suppurations, from the peculiar diathesis of the patient; elixir of vitriol, in combination with that medicine; the blue pill, as an aperient, when one is required; opium, especially at night, and flannel next the skin.

SECTION IV.

ENLARGEMENTS OF THE SPLEEN.

I. By enlargement of the spleen we are not to understand the swelling which accompanies splenitis, which may be inconsiderable, especially when the inflammation is serous. The enlargement which now occupies us, *may* exist independently of inflammation, and certainly does not arise from it. The same pathological cause which produces enlargement, may also generate inflammation; but, in many cases, it does not; in all, however, it so predisposes to that disease, that slight exciting causes may bring it on. Inflammation is, then, a contingent of enlargement. Now and then it is acute, and may, perhaps, prove fatal; but I have not witnessed such a termination. More commonly, however, it assumes a chronic form, or returns at irregular intervals in a subacute grade.

II. Enlargements of the spleen are spoken of, by some pathologists, as hypertrophies. But this is a misapplication of the term. The augmentation of size, which can be brought about, in a few days, by a pathological cause, cannot, with propriety, be called an increase of growth. As well might we call anasarca, an hypertrophy of the cellular membrane. The spleen is undoubtedly a peculiar variety of erectile tissue; and when it becomes suddenly enlarged, we are bound to regard the material which gives it distension as blood. It may be alleged, however, that it is not blood, but an increase of the peculiar, pulpy matter, which at all times fills the areolar structure of the organ; but it seems contrary to analogy, that a pathological condition should augment the product of the healthy function of an organ. The rapid reduction, in bulk, which recent enlargements of the spleen sometimes undergo, is another argument for the theory of simple congestion and stasis. If the contents of the splenic sac be examined, when the organ is in such a state, we of course, have a mixture of black or stagnant blood, and the peculiar pulp of the organ, with its Malphigian corpuscles. Under this exces-

ave distension and immersion, for some time, in the same blood, the internal fibrous structure will, of course, lose much of its cohesion; and the whole substance of the organ, when its capsule is penetrated with the finger, be found almost as tender as a coagulum of blood; and this, as we have seen, is the condition of the organ in many who die of autumnal fever.

III. But enlargement very commonly remains long after the fever, which occasioned it has been cured. On what then does it depend? Doubtless, in some cases, it depends on the coagulation of the blood, whereby its fibrinous portion, in detached or adherent filaments, is mingled with the more fluid portions; and, sometimes, on the infiltration of coagulating lymph, from subacute, parenchymatous inflammation; giving increased density to the organ, and rendering its reduction to the original size an impracticable undertaking. But, in most instances, it would seem there is nothing more than a loss of contractility in the areolar and vascular tissues, by which it continues to receive and contain a large quantity of blood, as in the following—

Case.—Dr. Hurlbert, of Ottawa, Illinois, in the year 1838, was called to see an Irish immigrant, who had been a soldier in the West Indies; while there he suffered from intermittent fever, and the enlargement of the spleen which followed, had continued for fifteen or twenty years. The organ projected across the abdomen to the right iliac region. When the Doctor arrived the patient had high fever, with hard pulse, abdominal tenderness, pain in the left hypochondrium, irritable stomach and some difficulty of breathing—in short, labored under acute splenitis. He was bled five times, blistered, and took freely of calomel and diaphoretics, which subdued the inflammation. During his convalescence, the swelling of his spleen began to abate; and two years afterward, when the Doctor saw him, it was entirely gone. It can scarcely be suppposed that this reduction would have taken place, if the organ had been hypertrophied or indurated, for fifteen or twenty years.

IV. I have already referred to two cases of suppuration, in enlarged spleens, from blows on the left hypochondrium. It remains, now, to add, that such violence may occasion a rupture of the organ, and the consequent death of the patient, as appears from the following—

Case.—An Irishman who had labored on the canal, between Lake Michigan and the Illinois River for a twelve month, during which he had experienced several attacks of intermittent fever, came to Peoria, Illinois, in a state of emaciation, but with a tumid abdomen. His complexion was of a greenish-yellow tint; while the whites of his eyes showed a bluish tinge. In a quarrel he received a kick on the region of the spleen, which he survived four days. Dr. Dickinson and Dr. Tucker made a post-mortem examination. The intestines were adherent from recent inflammation. The spleen was six or seven times its usual size; some parts of it were in a state of induration, and of a greenish-yellow color; others were softer and

darker. It was ruptured, and a quantity of blood had escaped into the peritoneal cavity.

But the rupture may be spontaneous, as appears from the following—

Case.—A patient of Dr. Cross, in the same town, had intermittent fever for eight or ten days, from which he recovered. About a month afterward, he was attacked with ague, of which he had several relapses. On a certain morning, while walking about, he was attacked with a chill, followed by fever. He took a cathartic, and on rising, during the hot stage, he fell down and expired. Twenty hours after death, his body was examined. The spleen presented a large circular and ragged aperture; and was so tender that it could not bear its own weight. About a gallon of blood, taking that which had already escaped into the peritoneum, with what was forced out by compression, made the quantity which the organ had contained.

V. In its early stages, enlargement of the spleen may be detected by dulness of sound, on percussion, over the false ribs of the left side, the respiratory murmur of that region being unaltered. But, that this sign may lead to a false diagnosis, I was lately taught by the subjoined—

Case.—I was called into consultation by Dr. Dodge of this city, on a patient who labored under cerebral inflammation, of which he died. In attempting by percussion and auscultation, to ascertain whether his disease might not be complicated with pneumonia, we found a manifest dulness over the left hypochondriac region; but the respiratory murmur was entirely normal. We, of course, concluded that, from an attack of autumnal fever at some former period, he had an enlargement of the spleen, though not great enough to project below the ribs; but to our surprise, on examining the body after death, we found the left lobe of the liver so hypertrophied, that it was jammed against the spleen, which had its natural size.

After the tumor has advanced below the cartilages of the ribs it cannot be confounded with any other swelling except that attendant on suppuration of the kidneys, from which it may be distinguished by the previous history.

The subject of enlarged spleen is, generally, more or less emaciated in his limbs, while his abdomen is tumid. His complexion is wan; yellowish, but less so than in affections of the liver; indistinctly greenish, or chlorotic, dirty leuco-phlegmatic; or, finally, that of cancerous cachexia. The whites of the eyes have not the sallowness produced by liver disease. This change of complexion deserves to be taken into account in our investigations into the functions of the spleen. Is it probable that the organ exerts any influence on hæmatosis? That the blood is in a pathological condition, cannot, I think, be doubted; not only from the altered complexion of the patient, but from the hemorrhages from the stomach and bowels, to which he is liable. I knew a gentleman with enlarged spleen, who had two copious hemorrhages of this kind; and a number of our physicians have

witnessed the same thing. As illustrating this assertion, and showing, at the same time, two other interesting facts, I will cite a case given me by Dr. Wallace, of Akron, Ohio.

Case.—A man experienced an attack of remittent fever, with relapses, in an intermittent form, and was severely salivated. There followed on this treatment, so great a susceptibility to the action of all mercurial preparations, that for years afterward, he could detect the smallest quantity, administered to him, by the constitutional irritation, morbid vigilance, and diarrhœa, that would inevitably follow. When exposed to a cold and damp atmosphere, his spleen would suddenly swell, so as to bulge out below his ribs; and in the course of the following night, under the influence of opium, and diaphoretics, it would recede. He was never without tenderness in the splenic region; but had no dropsy. He used iodine with some benefit, but, while his health seemed to be gradually improving, he died, suddenly, of hemorrhage from the stomach and bowels.

Of the influence of enlarged spleen, in favoring relapses in intermittent fever, I have already spoken. Some patients have observed, that active exercise was followed by a return of the Fever. The connexion between this affection of the spleen, and dropsy, will be considered, in another section. In many cases, the appetite of the patient, and his digestion, are very tolerable; and he regards his "ague-cake," as a mere inconvenience. In some instances, however, it becomes a burden, for it may extend into the right iliac region, and rest upon the brim of the pelvis. In general, the enlarged spleen does not leave its position; but, a short time since, Dr. Moffit, one of the house physicians of the Commercial Hospital, in this city, called my attention to a patient, who some years before had suffered from intermittent fever, in whose abdomen there was a hard, spleniform tumor, three or four times the size of the spleen, which could be moved to any part of the abdomen, though it inclined to the left side; and could be nothing else, I think, but that organ in a state of dislocation.

VI. TREATMENT.—When the symptoms of splenitis are present, the appropriate antiphlogistic treatment, must be first employed; under which the enlargement sometimes rapidly diminishes. But the majority of cases do not thus yield; and then the practice becomes in a great degree empirical, consisting of various therapeutic agents, which we must consider, *seriatim*.

1. An occasional *emetic* is beneficial. It agitates the affected organ, and thus promotes the circulation of its stagnant blood; increases the activity of the absorbent vessels; determines to the surface of the body; and prepares the stomach for the reception of other medicines. But the loss of density and strength, in the capsule and fibrous texture of the spleen, is sometimes so great, that in vomiting, a rupture might occur; and, therefore, emetics should not be ordered, without care and circumspection.

2. *Cathartics* are not liable to that objection; and, those which act as hydragogues, often prove beneficial. Care must be taken not to reproduce

the Fever, by continuing their action too long. One of the best is the compound powder of jalap with the bark. Another is a pill composed of one grain of blue mass, one of aloes, two of rhubarb, and a fourth of a grain of elaterium. Free purging may be effected with two or three of these pills; and a single one will operate as an aperient. When the liver is torpid, and the discharges are not colored with bile, the elaterium should be omitted, and the quantity of blue mass doubled.

3. *Diuretics* are frequently prescribed in this affection. They were probably, at first, suggested by the dropsy which is often present. I am not certain as to their effects in my own practice, but have thought them beneficial. The following formula is as good as any other:—

℞.—Pulverized Squill,	- - - - -	gr. xxiv.
Nitrate of Potash,	- - - - -	ʒii.

Mix intimately, and divide into twelve papers: one to be taken three times a day. When inflammation is present, this refrigerant diuretic will be peculiarly proper. In an opposite diathesis, or when the tendency to relapse is great, two grains of the sulphate of quinine should be added to the powder.

4. The *bark*, combined with an equal quantity of cream of tartar, has often done good. Should this compound purge too much, the proportion of the latter must be diminished.

But the sulphate of quinine has attained a higher reputation than the bark. It is peculiarly demanded in recent cases, while the original morbid diathesis still lingers in the system. When given in the declining stage of splenitis its effects on the enlargement, are, perhaps, more favorable than in any other condition. And this leads me to say, that when no inflammation is present, an occasional bloodletting, if the powers of the system should not be greatly reduced, will much increase the efficacy of the bark, quinine, and other bitters, stimulants, and alterants. Many physicians, who practise where malignant intermittents prevail, speak in high terms of quinine, in the splenic enlargements, which are so rapidly generated by that form of fever; but, I have not met with any, who had witnessed the instantaneous effects which Piorry declares he has seen in the hospitals of Paris. When inflammation still lingers in the organ, the union of nitrate of potash with the quinine, is highly beneficial. Ten grains of the former, with five grains of the latter, may be given three or four times in the twenty-four hours. On the other hand, if the excitement be low, it will be proper to substitute for the nitre, five grains of Dover's powder.

5. *Iodine*, from its promoting the absorption of goitrous tumors, has been extensively employed for enlargements of the spleen; and was expected to act on the absorbent system. It has, undoubtedly, effected the object for which it was administered; but not so constantly as to meet the anticipations under which it was at first prescribed. An extemporaneous formula,

consisting of iodine or its tincture, administered in a solution of the hydriodate of potash, may be readily devised; or the latter may be given alone, in quantities varying from half a drachm to two drachms in the day and night.

In the hands of some of our physicians, bromine has proved useful; but I cannot speak of it from experience.

6. Referring to the impoverished or spansæmic condition of the blood, *chalybeates* seem indicated. I have seen good effects from the proto-carbonate of iron, in combination with the bi-tartrate of potash; but the best preparation, when properly made and preserved, is the iodide of iron. It may be presumed that the ferrocyanate of quinine would be efficacious in cases demanding a chalybeate, but I do not know that it has been employed.

7. *Counter-irritation*, with blisters or antimonial ointment, is a common remedy. The former are to be preferred. To be of service, the plaster should be large.

8. Throughout the whole treatment, the patient should be supported by nutritious diet, and have the excitement and perspiratory function of the skin maintained by stimulating baths, frictions, and the use of flannel.

9. In many instances it is impossible to reduce the enlargement, while the patient continues in the locality where it originated; and it has been known to disappear, without remedies, under a change of place. Thus, Dr. Echols, of Selma, Alabama, went to Lexington for the prosecution of his studies, while laboring under an enlarged spleen; and returned, in eighteen months, free from the disease, although he had discontinued all medicines.

VII. ACTUAL PRACTICE OF MANY OF OUR PHYSICIANS.—I will now mention the modes of practice pursued by a number of physicians, beginning with the northern:—

Dr. Conant, of Maumee, Ohio, treats subacute inflammatory cases with oil of turpentine, externally and internally. Professor Brainard, of Chicago, Illinois, uses the blue mass, sulphate of quinine, and extract of taraxacum, with blisters. Dr. Henry, of Springfield, in the same state, after trying iodine ointment, and mild mercurials, with some success, was led to employ the sulphate of quinine and the blue mass combined; from which he obtained much greater benefits. Dr. Fry, of Peoria, in the state just mentioned, uses sulphate of quinine and sulphate of iron combined, keeping the bowels open with jalap or the extract of taraxacum. Has seen the hydrobromate of potash cure two cases, and do good in a third. Dr. Howland, of Ottawa, in that state, sometimes bleeds once; but relies upon the external use of iodine, and the internal administration of extract of conium maculatum, sulphate of iron, and aloes, combined, and given in pills. Dr. Thomas, of Boonville, Missouri, has used muriate of ammonia with advantage. Dr. Hutchinson, of the same place, has cured the disease with blue pill and blisters. Dr. Flournoy, of Lexington, often bleeds in the beginning, then gives the muriate of ammonia, blue pill, and tartar emetic, combined, em-

ploying external irritants at the same time. Dr. Digges, of the same town, uses iodine and cutaneous irritation. He has tried the muriate of ammonia only in old cases, when it failed. Dr. Long, of Marshall, in that state, has found the sulphate of quinine beneficial. Dr. Price, of Arrow Rock, uses external irritation, and administers the hydriodate of potash, with aperients, internally. Dr. Christian, of Memphis, has used small doses of calomel or blue pill, with tartar emetic, and muriate of ammonia, followed by the bark; but has often found a change of locality indispensable to recovery. Drs. Shanks and Frazier, of the same city, have employed scarification and cupping, dry cupping, blistering, and the deuto-ioduret of mercury, externally, bitters and stimulating aperients, internally.

Dr. S. B. Malone, of Columbus, Mississippi, blisters, applies a plaster of cicuta, and administers calomel and the sulphate of quinine. Dr. Searcy, of Tuscaloosa, Alabama, has found the following compound useful:

R.—Sulphate of Quinine,	- - - -	} each ʒi.
Castile Soap,	- - - - -	
Aloes,	- - - - - -	} each ʒss.
Rhubarb,	- - - - - -	
Blue mass,	- - - - - -	

Mix, and make into pills of the common size—one to be given three times a day.

Dr. Guild, of the same town, bleeds, purges, and then administers quinine. Dr. Haywood, also of the same town, has found the disease to disappear spontaneously; but sometimes uses calomel and tartar emetic in small doses. Drs. Dancy, Parish, and Davis, of Greensboro', in the same state, have observed the spontaneous disappearance of the disease; but, occasionally, prescribe blisters or tartar emetic ointment, and small doses of calomel. Dr. Echols, of Selma, treats it with cathartics and external liniments. Dr. Fearn, of Mobile, has used, successfully, the blue mass and rhubarb at night, with carbonate of potash and powdered mustard as diuretics, and the sulphate of quinine, with infusion of gentian, as a tonic.

VIII. Concluding Remarks.—I find, on examining my notes, that in many instances, the treatment of enlargement of the spleen, was overlooked in my conversations with medical gentlemen; but quotations enough have been made to show the state of medical practice among us, in that affection. On the whole, I am disposed to believe it more inflammatory and obstinate in the North, than the South; as well as more frequent in proportion to the number of cases of intermittent fever. In the warmer latitudes, the enlargement seems to partake more of the character of simple congestion than in the colder climates.

It has sometimes been supposed that a premature use of the bark contributed to the production of enlarged spleen. If this ever happened, it was because the lancet had not been adequately employed before resorting to that medicine; which, from its tonic and stimulating qualities, may, at the same

time that it arrests the paroxysms of fever, contribute to disorder the viscera. Such an objection will not lie against the sulphate of quinine; and the sooner the Fever is checked, the less is the danger of enlarged spleen; as it is the repetition of the paroxysms, more than anything else, which produces that organic derangement. Nevertheless, venesection, in the higher latitudes, is of great value, as a preparative of the system for the quinine; and it is the omission of the lancet, which in many cases permits a result, that throws discredit on that medicine.

SECTION V.

DISEASES OF THE LIVER FROM AUTUMNAL FEVER.

I. THERE is much in the symptomatology and pathological anatomy of our autumnal fever to raise and perpetuate, in our minds, the idea of a deep implication of the liver, much to justify the epithet "bilious," so generally applied to them; which, indeed, would be a very convenient and appropriate term, if it could be so used as not to suggest the idea of their originating from some primary affection of the liver. All this implies that the biliary function is, in general, greatly disturbed in these fevers; which, we have already shown, both by the phenomena during life, and the appearances after death, to be the case. The proper treatment of the morbid conditions of the liver during the Fever has been already pointed out; and we come now to inquire into its condition after the Fever has been arrested. In doing this, the first act which meets us is, that in many cases, the functions of the organ are natural and healthy from the termination of the Fever; the next, that when they are morbid, the liver appears in some cases to be free from inflammation, in others to be inflamed. We must study these conditions separately.

II. MERE FUNCTIONAL LESIONS.—1. Torpor, or inactivity of the organ in its secretory or excretory function, appears, sometimes, to constitute the only morbid condition. I am disposed to believe that the liver is not, like the kidneys or the lungs, an organ which secretes continuously, but that its action is essentially intermittent. Its relations are with the stomach and duodenum, whose functions are periodical; and the whole may be presumed to work, under the same law of intermittence. The universal habit of taking food *at intervals*, and the certainty with which digestion is impaired by the introduction of new aliment, while that previously taken is undergoing conversion into chyme, demonstrate that hunger and the functions of digestion are essentially periodical. That, while they may be modified by habit, they are the cause and not the effect of habit. The reason of this lies quite on the surface. If food were taken continuously, much of it would necessarily pass the pylorus undigested; and not having experienced the action of the stomach, could not be converted into chyle, and would be lost to the nour-

ishment of the system. The natural periodicity of the functions of the stomach being established, a corresponding periodicity, must be admitted in the functions of the duodenum. The chyme being prepared, the pylorus expands, and the stomach, changing its mode of muscular movement from a gestatory to a peristaltic or expulsive, pushes the alimentary mass into the supplemental organ, there to receive an impregnation of bile and pancreatic juice; after which the compound is to be transmitted to the small intestines for absorption into the system. Now it would be a physiological absurdity for the liver and pancreas to pour out continuous currents of secreted fluid, when the ends for which they are formed can only be accomplished at intervals. I conclude, then, that those organs, when the individual is in health, are stimulated into activity by the impress of food in the stomach, the excited state of which invites into the cœliac artery more blood than before; whereby more is sent through the liver by the hepatic artery, and especially by the vena porta; and thus, it is not only roused into action by its nervous associations with the stomach, but by the increased supply of blood. The secretion of bile and pancreatic juice goes on with activity, under such circumstances; the excretory ducts become filled; and, by the time the chyme begins to pass the pylorus, the currents of secreted fluid are pouring into the duodenum, to mingle with it—secretion, then, giving place to excretion, to be revived on the next call of the stomach. If these physiological speculations be correct, it follows, that while the liver performs a continuous function of circulation in transmitting the blood of the vena porta, it executes a periodical function of secretion and excretion.

Now an organ whose function is periodical is much more likely to fall into torpor or inaction, than one whose function is incessant. Hence the frequency of torpidity, or suspended secretion in the liver, and its continuance in so many instances after attacks of autumnal fever. In this condition, the elements of the bile, which are developed in the blood, are not collected and combined in that organ; and one of them, the coloring matter, manifests itself in the complexion, the urine, and the serum of the blood. In this manner, a variety of jaundice, more or less intense, may arise. But when the secretion of bile is not suspended, the *excretion* may be. The biliary ducts may not act with energy; or duodenal inflammation or irritation during the Fever, may have extended to the common gall duct and caused a thickening of its mucous membrane, or a spasmodic constriction; which, remaining, may interfere with the excretion of the bile. In these pathological conditions, the sallowness may be even deeper than in the other; and in all, the stomach, from its sympathy with the liver and the bowels from the same cause, and also from the absence of their natural stimulus, the bile, soon show a variety of functional disturbances, such as anorexia, flatulence, acidity, constipation, or diarrhœa. As long as these conditions of the liver continue, the convalescence of the patient will be slow and un-

satisfactory; his muscles of locomotion will be weak; his heart feeble and irritated; his nervous system morbidly sensitive, and his spirits gloomy. All this, I suppose, may exist without the slightest inflammatory affection of the organ; but it constitutes a good predisposition; and, if allowed to continue, vicissitudes of temperature, or some other cause, may, at length, excite inflammation. Let us now direct our attention to the removal of these functional disorders.

III. THE REMEDIES.—Before prescribing for the pathological conditions, the physician should, by his knowledge of diagnosis, ascertain that inflammation does not exist, when he may pursue the following method:—

1. An active emetic is generally of signal service. Nothing arouses the liver to renewed secretory action, or emulges its ducts, more successfully. One of the best is an infusion of the root of the sanguinaria canadensis with ipecac. Tartarized antimony is too sedative; and, if it be used, should be dissolved in some stimulating draught, as a tea of valerian root; an opiate to be given after the operation.

2. An active cathartic should next be administered. If the patient should labor under diarrhœa, a large dose of calomel and rhubarb, followed by an opiate at night, will be proper. If costive, a portion of calomel at night, with infusion of senna the next morning, or a dose of pills, composed of equal parts of calomel, gamboge, and aloes, should be given; and, after the operation, an anodyne.

3. The patient may now be put upon the use, every night, of two or more of the following pills:—

℞.—Blue mass, - - - - - } each ʒss.
Aloes, - - - - - }
Ipecac, - - - - - }
Extract of taraxacum, - - - ʒiss.
Mix, and make into thirty-two pills.

4. In the day, as much tincture of rhubarb with gentian, as may be necessary to secure, with the pills, two or three alvine evacuations, should be administered; or the pills being sufficient to keep up the action of the bowels; a cold infusion (made by displacement) of the bark of the wild cherry tree (*Prunus Virginiana*), may be substituted for the tincture, which will be especially required when there is stricture of the common gall duct—the prussic acid of the infusion, being well fitted to relieve that condition; while it stimulates the patient into greater cheerfulness.

5. Antacids will, in most cases, be required. The subcarbonated alkalies answer very well in ordinary cases; but, if the bowels should be obstinately torpid, magnesia will be better; or, on the other hand, if diarrhœa be present, lime-water and boiled milk should be preferred.

6. The region of the liver should be sponged, and the feet immersed, in a hot nitro-muriatic solution, and flannel should be worn next the skin.

7. The diet of the patient ought to be nutritious, savory, and stimulating, but moderate in quantity.

8. He should be exhorted to take as much exercise as possible, on horseback, or on foot, in the open air.

9. Throughout the whole treatment, his nervous system will demand gentle narcotics and stimulants, especially at night, of which more will be said under the next head.

By these means, the uninflammatory hepatic torpor, following our autumnal fever may, in general, be soon removed. Let us now turn our attention to the inflammatory condition of the liver.

IV. SUBACUTE HEPATITIS.—I. The acute inflammation to which the liver is liable, during the Fever, may remain in a subacute form, after that disease has been arrested; or the organ being, at the close of the Fever, in a state of torpor or engorgement, inflammation, under the influence of exciting causes, may supervene. On the relations between subacute hepatitis and the Fever, of which it is a consequence, the following remarks may be made:—

1. While, as we have seen, splenitis oftener follows intermittent than remittent fever, hepatitis is more frequently the effect of the latter than the former. It would be erroneous to say, that either is confined to a particular form of the Fever; but that each has a closer connexion with one than the other is, I think, certain. I cannot explain the more frequent occurrence of hepatitis than splenitis, in remittent fever, except it be, that a gastro-enteritis is oftener present in the former than the latter, and by continuity of mucous membrane, or sympathy, excites hepatitis.

2. Of the relative frequency of these two affections, as consequences of autumnal fever, I cannot speak with statistical or numerical accuracy, but believe that the spleen suffers oftener than the liver. Slight degrees of inflammation may pass undetected in the former organ; but, when seated in the latter, they manifest themselves in an obvious manner. Thus, it seems probable, from the number of known cases of splenitis, that if all were discovered, the catalogue would much exceed that of hepatitis, from the causes we are now considering.

3. Of the relative prevalence of hepatitis, from the Fever, in the North and the South, I cannot speak positively; but inquiry has satisfied me, that there is quite as much of it in the former as in the latter, in proportion to the number of fever cases.

4. Hepatitis, I think, is more apt to run into suppuration, in the southern than in the northern portions of the Valley. The number of hepatic suppurations, of which I have collected an account, is less than the number of splenic abscesses. A large majority of them were south of Memphis; the reverse of what is true in regard to abscesses of the spleen. Of the cases, the mode of termination of which I have ascertained, five, occurring in the practice of Dr. Drish, of Tuscaloosa, Alabama, discharged themselves through

the lungs; one, a patient of Dr. Shanks, of Memphis, opened externally; and one, mentioned to me by Dr. Vivian, of Dover, Missouri, took the direction of the bowels. Dr. Fearn, of Mobile, has had several cases, the termination of which I did not record.

5. In estimating the influence of autumnal fever in producing hepatitis, we must not forget the effects of alcoholic intemperance in exciting or predisposing to that affection; and thus causing it to occur more frequently than it would from the Fever alone.

6. When at Memphis, Dr. Shanks took me to see a river-woman, who, after an attack of intermittent fever, had, at the same time, an enlarged spleen, and a suppurating liver which pointed externally.

7. If hepatic abscesses, as appears probable, are more common in proportion to the number of cases of hepatitis, in the South than in the North, it follows that the inflammation is oftener parenchymatous in the former—membranous in the latter; and this may explain the fact, that bilious appearances are rather more conspicuous in the South than the North, while the number of cases of hepatitis is not greater.

8. There are few inflammations more apt to recur than hepatitis. I know a lady in whom the disease followed autumnal fever, while she was still a child, that relapsed, at various times for the next thirty years; several of the attacks being prolonged and violent.

II. The symptoms of subacute or chronic hepatitis, are constipation or diarrhœa; a suspended, depraved, or increased secretion of bile; acidity and irritability of stomach; variable appetite; in general, a foul and yellowish tongue; more or less jaundice of the skin and eyes, with yellowness of the urine; tenderness, and sometimes pain in the epigastric and right hypochondriac regions; aching about the right shoulder, sometimes descending into the arm; inconvenience in lying on the left side; a hacking cough, without expectoration; a dry, harsh, and insensible skin with coldness of the feet; occasional flushes of fever, according to the degree of inflammation; almost constant frequency of the pulse, with fits of palpitation of the heart; reduced activity of mind, whimsicality, despondency, irresolution, and fear of death. In addition to the direct sympathy of various parts of the body with the liver, they sympathize with the stomach, which is dyspeptic; with the bowels, from which the liver withholds a due supply of bile, or irritates, with that which is unhealthy; but, above all, the whole nervous system, and, indeed, all the tissues of the body, are irritated by the bile, or its elements, which float with the circulating currents, and act on the exquisitely susceptible interior membrane of the arteries.

III. 1. In the treatment of the hepatitis following on autumnal fever, a copious bloodletting, in the higher latitudes, is, in some cases, indispensable, but there are very few patients that will bear its repetition; and the greater number do not demand the lancet. The depressing influence of biliary matter, mingled with the blood, seems to be the reason why copious vene-

section is not supported in this inflammation; but we must ascribe a part of the intolerance of this remedy, to the paroxysmal character of the Fever, which generated the inflammation. When general bleeding seems unadvisable, cupping may be employed with advantage.

2. The administration of small doses of calomel or the blue mass—I regard the former as preferable—should be continued to the extent of ten or twenty grains a day, until the mouth is slightly affected. If much fever be present and the stomach irritable, nitrate of potash may be advantageously combined with the calomel; but when that organ is not specially involved, and the phlogistic action is considerable, minute doses of tartarized antimony or ipecac will prove beneficial.

3. An occasional emetic or cathartic does good, by emulging the gall ducts —the inflammation being of a low grade—and, at all times, the latter will be proper, to keep up the peristaltic action of the bowels.

4. In obstinate cases, nitric acid internally may be tried; and, in every stage and grade of the disease, the nitro-muriatic lotion to the right hypochondriac region, and the feet, will be beneficial.

5. The extract of taraxacum often does good in this disease; but to produce effect, it should be administered in larger quantities than are commonly given. Its powers are feeble; and less than two drachms every twenty-four hours, will not be likely to accomplish anything.

6. When the disease continues till the succeeding summer, and is accompanied by constipation of the bowels, sulphur-waters, drank for a few weeks, are often exceedingly beneficial. But, to prove so, the keen appetite which they produce, must not be indulged; and, by the use of an opiate at bedtime, the sulphur should, if possible, be determined to the skin.

7. In every stage of the disease, the morbid sensibility and irritability of the system must be palliated, with gentle narcotics, and antispasmodics; which, as far as practicable, should be so combined with diaphoretics, as to act upon the skin. To this end it is advantageous to combine Dover's powder, with the evening dose of calomel; but the constitutional irritation often requires the administration of gentle narcotics, and stimulants in the day, when a pill of four grains of assafœtida, and a fourth of a grain of opium, may be administered, at such intervals as seem necessary. Or, in its stead, the following formula may be used:—

℞.—Sulphate of Morphine, - - - - - gr. ii.
Sulphuric Ether, - - - - - - ʒij.
Simple Syrup, - - - - - - - ℥ii.—Mix.

A teaspoonful, diluted with cold water, to be taken at discretion.

As all medicines of this class, soon lose their effects; and many cases of subacute hepatitis continue for a long time; a change of the narcotico-antispasmodic, often becomes necessary; and therefore, I subjoin the following:—

℞.—Tincture of Valerian, - - - - - ℥ii.
Ammoniated Alcohol, - - - - - ℥ij.
Tincture of Opium, - - - - - ℥i.—Mix.
A teaspoonful to be occasionally administered.

When we look at the value of the sulphate of quinine, in chronic splenitis, we may suppose that, it must be serviceable in chronic hepatitis from autumnal fever, and as it coincides, in action, with the medicines we are now considering, it is proper to employ it. Combined with Dover's powder, in the proportion of five grains of one to ten of the other, it may be given at night; or it may be administered, now and then, throughout the twenty-four hours, according to the following formula:—

℞.—Sulphate of Quinine, - - - - - ℈i.
" Morphine, - - - - gr. i.
Aromatic Sulphuric Acid, - - - - gtt. x.
Sulphuric Ether, - - - - - ℥i.
Simple Syrup, - - - - - ℥i.—Mix.
A teaspoonful to be given as occasion may require.

8. In many instances, a change of climate becomes indispensable. It must always be made from a warmer to a colder latitude; choosing, at the same time, a locality but little infested with autumnal fever.

9. I do not give a separate consideration to the diarrhœa, which in some cases follows on autumnal fever, as it is, generally, symptomatic of liver disease, and ceases when its pathological cause is removed.

SECTION VI.

DROPSY.

I. History.—Dropsy is another consequence of autumnal fever. In slight cases, the serous infiltration is limited to the lower extremities; but in the graver, extends to the whole subcutaneous cellular tissue, giving universal anasarca. Ascites is less common; and, never occurs, I believe, without cellular infiltration of the legs and feet. Hydrothorax from this cause is exceedingly rare, and hydropericardium, still rarer.

Dropsy seldom follows on remittent fever, except it terminate in the intermittent form. When intermittents are cured at an early period, dropsy seldom appears. Chronic cases are commonly its pathological cause. Sometimes, when the anasarca commences, the paroxysms of fever cease to recur; and after the lapse of a little time, the effusion ceases, that which had accumulated is absorbed and the patient is restored. In other cases, both the paroxysms and the infiltration, keep on, until the limbs swell to a great size and the ascites assumes a formidable character. In such cases, the Fever has been peculiarly obstinate, and of long duration; or the constitution has

been previously broken down by other diseases, or by intemperance. A high grade of the lymphatic temperament may, however, lead to the same result. Under these sinister circumstances, the disease may prove intractable; and hydrothorax, or even hydropericardium, may at last supervene, and prove fatal. Dropsy from autumnal fever prevails, as extensively as the Fever itself; but whether it occurs more frequently to the North or to the South, I am unable to say.

II. Pathology.—A difference of opinion prevails as to the immediate cause of this serous accumulation.

1. One theory is, that the absorbent system is left in a torpid condition by the Fever, in consequence of which the serum, which naturally bedews the cellular tissue and the peritoneal sac, becomes accumulated; and the practice founded on this assumption is generally successful; a fact which supports though it may not establish, the hypothesis.

2. Another theory, refers it to increased secretion. This has been applied to ascites oftener than to anasarca; the peritoneum having been left, it was said, in a state of subacute inflammation. Such a condition of that membrane may undoubtedly exist after the Fever, and produce ascites; but we have no evidence of the fact; or that any degree of inflammatory action, prevails in the cellular tissue of the extremities. By experiments on the urine, I have found that sometimes it is albuminous; oftener is not. But if that condition should be present, and as Dr. Blackall believes indicate inflammation, it does not follow, that it would be in the peritoneum, seeing that both the liver and the spleen are more probable seats.

3. The popular opinion, both in and out of the profession, is, that these dropsies are occasioned by diseases of the spleen; which operate to produce effusion, in two modes: *a*. By the increased secretion from the inflamed surface, generating ascites; *b*. By the compression of the vena portæ, when the organ is enlarged, obstructing the return of blood from the abdominal viscera, and thus occasioning effusion into the peritoneal cavity; while by compression of the ascending vena cava, it determines a state of venous congestion in the lower extremities, and a consequent increase of serous effusion. That a subacute inflammation of the serous covering of the spleen may cause increased secretion, is undeniable; but in many cases, the extent of that surface is so entirely disproportionate to the amount of dropsical effusion into the cavity of the peritoneum, as greatly to invalidate this hypothesis; which, moreover, will not in any degree explain the production of anasarca. But may not compression of the vena portæ be adopted as the pathological cause of ascites? The answer must be in the negative; for, in the first place, many cases of ascites occur when the spleen is not so enlarged as to reach to the linea alba; and in the second place, it is almost impossible that *any* enlargement, however great, or in whatever direction, should exercise a compressing power over that vein. Still less can it be exercised upon the hepatic veins. But in reference to anasarca, the opinion is held, that the enlarged organ, exerts itself on the ascending cava. In this

case, however, the ascites is left unexplained. Nevertheless, as the two forms of dropsy *may* depend on different pathological causes it is proper that splenic enlargement, as a cause of anasarca, should be more carefully considered.

I assume, then, that this enlargement is not a mechanical cause of anasarca, and rest the assumption on the following facts:—

a. It seems nearly impossible, that enlargement of the spleen should compress the ascending cava; which not only lies to the right side of the vertebræ, but is protected by the aorta, the diameter of which, however, it must be admitted, is not equal to that of the cava. And, as the organ advances across the abdomen, its convex surface continues in contact with the anterior walls, and the stomach and bowels are consequently behind, and interposed between, it and the great vein.

b. Many cases of anasarca follow intermittent fever, when the spleen is so little enlarged as not to reach the median line of the abdomen, nor, even project beyond the cartilages of the ribs; and when, of course, its mechanical action on the vein is an impossibility.

c. It is a fact of general notoriety, that many persons have their spleens enlarged to great dimensions, even for years, without experiencing anasarca.

d. It is equally true, that when both affections exist, the anasarca may be removed, and the enlarged spleen still remain.

e. We frequently see a considerable degree of œdema of the face and other portions of the body, co-existing with the anasarca of the lower extremities, and this too when the patient has not just risen from a recumbent posture, favoring the diffusion of the serum throughout the cellular system generally, but after he has been on his feet throughout the day; showing that the effusion had taken place in the upper parts of the body.

From these facts we may conclude that although enlarged spleen and dropsy, often co-exist, after intermittent fever, the former is not a *mechanical* cause of the latter. And, yet, it seems probable, that enlargements of the spleen do, but in a different manner, favor the production of dropsy. The blood which sojourns in the organ, may, perhaps, undergo changes, which contribute to a vitiation of the whole mass. We must, I think, admit such changes, though we are unable to show their exact nature. We know that in many cases of rupture of the organ, or of cutting into it in post-mortem inspections, the blood which escapes is unusually black and will not spontaneously coagulate. Professor Gross* has cited a great number of authorities, for the fact, that in fevers, both the peculiar pulp, and the blood of enlarged spleens, may assume a dark, dirty hue, a black-currant-jelly-like appearance, or the aspect of tar. Now, this blood, if the patient should not die, must of necessity, sooner or later, make its way through the vena portæ, to the general circulation; and thus, if a morbid state of that fluid can be a cause

* Pathological Anatomy: Article Spleen.

of dropsy, it may be, that enlargement of the spleen contributes to the production of that disease.

4. The diseases of the liver, studied in the last section, have been regarded as the cause of dropsy. Let us look at the facts in support of this opinion:—

a. Diseases of the liver, from intemperance, produce permanent jaundice, and, finally, all the different forms of dropsy; and why may not hepatic diseases, from autumnal fever, originate the same effusion?

b. But it may be said, that remittent fever disorders the liver more than intermittent, while dropsy oftener follows the latter than the former. This, however, may be for the reason, that intermittents so often follow remittents. The mischief to the organ, may have been done in the early stage of the fever: its consequences may show themselves after the fever has ceased, or changed to an intermittent. Original intermittents, however, do themselves produce lesions of that organ, of which every physician, in the Valley, must have seen examples.

c. We can perceive how organic disorders of the liver may produce dropsy. *First.* An obstructed circulation through the organ, necessarily leads to a state of venous congestion, in all the portal viscera, which may be the proximate cause of increased serous secretion into the peritoneal sac, and the production of ascites. *Second.* When tumefied, the organ from lying near to and on the same side of the vertebral column with the vena cava, may compress it, and thus generate anasarca.

d. Besides the function of transmitting the blood from the other abdominal organs, the liver is charged with separating from it the elements of the bile, which, failing adequately to do, they accumulate in that fluid. It appears, moreover, that in autumnal fever, there is an extraordinary development of biliary elements; and that a copious secretion and excretion of bile is, in general, a condition of perfect recovery. Here, then, we have an abundant source of impurity of the blood; and to this pathological state, we may, perhaps, in part, ascribe the hydropic effusion.

5. It is well known, that in protracted intermittent fever, the sweats, which follow the occasional paroxysms, are generally offensive. Even while I am writing this article, a student, laboring under a relapsing intermittent, with subacute inflammation of the spleen, but without liver disease or dropsy, assures me that the perspiration which follows every return of his chill and fever is sour and disgusting in its odor; a sufficient evidence of a pathological state of the blood.

6. The state of the urinary secretion, in autumnal fever, has not been well studied. We know, however, that the quantity of urine is often deficient; and that, in chronic cases, it frequently throws down sediments; another evidence that the blood is unhealthy.

7. To these sources of impurity we may, perhaps, add one more—the

constitutional morbid action of the solids. Whatever difficulty may now exist, or may forever exist, in comprehending the reciprocal actions and reactions of the blood and the containing solid tissues, no accurate observer can fail to notice many proofs of their reality. The blood and the solids are, in fact, so united anatomically and physiologically—placed in such relation to each other—that, *à priori*, it seems quite impossible for one to be in a morbid condition, without affecting the other; and hence, in the course of a protracted and relapsing intermittent fever, the blood may become impoverished in its red corpuscles or fibrine, or be otherwise deteriorated.

To the morbid condition of that fluid, generated in so many different ways, we should, no doubt, ascribe the leucophlegmatic, wan, leaden, or sallow appearance of those who have long had ague and fever; and we may, perhaps, refer to the same pathological cause, the copious hemorrhages from the stomach and bowels; which, as we have already seen, sometimes follow that disease, and which are commonly, but not intelligibly, ascribed to enlarged spleen. Of the tendency to hemorrhage, created by a deteriorated state of the blood, we have instructive examples in scurvy.

Let us now proceed to inquire whether we can deduce the dropsy consequent on autumnal fever, in whole or in part, from this sanguineous vitiation.

8. In proceeding to do this, we must exclude from the inquiry, *First.* The cases of ascites, which arise from subacute inflammation of the peritoneum. *Second.* Those which result from obstructed transmission of blood, through the hepatic ramifications of the vena portæ; and *Third.* Those anasarcas, if any, which are caused by the pressure of an enlarged liver on the ascending vena cava. After excluding all the cases which result from these pathological causes, I suppose a much larger number remain unaccounted for, and to them we must now give attention.

The pathological data, which lie before us, are the following: *First.* A relaxed and inactive state of the solids generally; *Second.* An impaired activity of the organs of excretion, especially of the skin, liver, and kidneys. *Third.* A deteriorated state of the blood.

Now, it is a physiological law, that if matters foreign to the constitution of the blood, find their way into it, by absorption, either external or interstitial; or are developed in it by disorder of the solids; or retained in it by defect of excernent action, they must either be decomposed and become a part of that fluid; or be eliminated through some of the emunctories of the system, or into its cavities. In the case of poisons injected into the blood-vessels, some take one direction, others another. Iodine and nitrate of potash seek the kidneys—emetine and phosphorus the lungs—tartar emetic the mucous membrane of the bowels. But in the case of dead organic matter, such as we suppose to pollute the blood in the pathological condition we are now studying, there may not be an eclectic tendency, for the reason that it has lately belonged, as it were, to the whole system; and if it should

direct itself upon the great organs of excretion, it might not be able to rouse them from their torpor. It is left, then, to irritate the serous and areolar membranes, and increase their exosmosis: a *passive* function, for which they are at the time so much the better fitted, as they are the more relaxed or reduced in texture and vital force by the previous fever. In this way appear to be generated those dropsical accumulations, which we are now studying; to the more rapid increase of which a defective absorption may be an auxiliary cause.

III. TREATMENT.—Let us test these hypotheses by studying the therapeutics which they demand, and comparing them with what experience has shown to be successful. *First.* Should a subacute inflammation of any abdominal organ or tissue, still remain, it should be subdued. *Second.* The great excretory functions must be re-excited; and, some one at least, brought, for a while, into greater activity than in health. *Third.* Absorption must be promoted. *Fourth.* The blood must be renovated, and the tone of the solids restored.

Such are the indications to be fulfilled, and they demand the very means which are known to be most efficacious; the study of which, in detail, must now receive attention.

1. When subacute peritonitis, hepatitis, or splenitis, or any complication of them, is known to exist, bloodletting, general and topical, must be the first remedy; under the free resort to which an immediate improvement often takes place; for secretion will be diminished and absorption promoted. As to the other antiphlogistic measures, they are so much the same with those required to fulfil the next indication, that they need not be here enumerated.

2. To re-excite the excretory functions, the means specifically adapted to each must be employed, but not at the same time. In fixing on any one with which to begin, the physician must exercise his sagacity. If the bowels have been torpid and costive, he may select them; if the liver, it; if the kidneys, them; he may even choose the skin and be successful. In administering the agents, respectively, appropriate to these great secretory outlets, if there be some degree of phlogistic diathesis, from visceral inflammation, he must choose the refrigerant and sedative. On the other hand, if the vital forces be greatly reduced, he should select the most exciting, and often administer stimuli at the same time, or the evacuants will not promote excretion. But a measure, preliminary to all others, may be the administration of an emetic, which tends to arouse the organs, generally, into increased activity, and gives greater efficacy to all that is subsequently done.

If the liver and bowels be fixed upon, as the first to which our remedies are to be directed, five grains of calomel or blue mass, with an equal quantity of Dover's powder, should be administered at bedtime; and, the following day, two scruples or a drachm of a powder, composed of equal parts of

jalap, nitre, and cream of tartar; to be aided in its operation, if necessary, with an infusion of senna and Epsom salt. On the following night, the calomel and Dover's powder should be repeated, and, on the next day, the hydragogue. This course may be pursued for three or four days, according as the strength of the patient seems, or does not seem, to admit of it. But, as a substitute for the cathartics mentioned, a sixth of a grain of elaterium and a scruple of cream of tartar, may be administered every two hours, beginning early in the morning, and continuing it until purging is produced. If, by these means, copious watery discharges, colored with bile, are effected, a rapid absorption of the effused fluid, and a consequent reduction of the swelling, will take place. Should the quantity of Dover's powder, mentioned, be found too small to produce tranquillity and sleep at night, it must be increased; and should the purging reproduce the ague, five or ten grains of sulphate of quinine, must be added to the opiate.

If this course should not have been adopted, or have been prosecuted without effect, the physician must determine his efforts upon the kidneys. He may still, however, act upon the liver with calomel or the blue mass, in conjunction with diuretics. A composition which, perhaps, exerts more power in these cases than any other, is two grains of one of the mercurials just mentioned, two of squill, and eight or ten of nitre, intimately incorporated, and administered, in the form of a bolus, every two hours, until the secretion of urine is augmented; and, then, every four hours, omitting the mercurial, if signs of approaching salivation should appear. As it will not affect the kidneys, should it act on the bowels, opium may be necessary. After this course has been continued for a few days, a copious flow of urine will, in general, take place; and, at the same time, a diminution of the swelling will denote the progress of absorption. Other sedative diuretics are employed in the Valley; of which I will only mention, as the best, an infusion of digitalis with the spirit of nitrous ether, taken in a solution of cream of tartar; and the hydriodate of potash, in ten or fifteen grain doses, three or four times a day.

Of stimulating diuretics, the oil of turpentine, in such doses as will not purge, often does good; and in cases of great torpidity, the tincture of cantharides may be given until strangury is excited, after which one of the compounds mentioned above, will keep up the discharge. Gin and water, or, even whiskey and water, are well adapted to cases of this kind. An infusion of green tea, taken cold, often produces a decided effect. My preceptor, Dr. Goforth, was exceedingly partial, in these cases, to the following popular and domestic formula:—

℞.—Parsley-Root, - - - - - }
Horse-Radish, - - - - - }
Black Mustard Seed, - - - - } each ℥iv, bruised.
Juniper Berries, - - - - - }
Squill, - - - - - - - - }
Rust of Iron, - - - - - } " ℥ss.

Mix and infuse in a gallon of hard cider for three days, in a covered vessel, and then, immediately after strong agitation, pass the liquid through a thin strainer, and bottle. The dose is from two to four ounces, four or six times a day. That the undissolved carbonate of iron, may be taken, the bottle should be agitated before pouring out the dose. I have repeatedly prescribed this compound with the happiest effects; and it is generally acceptable to the patient, because he regards the ingredients as *simples*.

In general, the diuretic treatment should be continued longer than the purgative; but there are limits beyond which it should not be carried, and the physician ought, at length, to turn his attention to another great function, that of the skin. This may, indeed, have been already done to some extent; for when Dover's powder was administered at night, and the purging was suspended, some influence was necessarily exerted on the external surface. The restoration of its functions, should now, however, become the main object, and, therefore, neither cathartics nor diuretics, should be administered. In the prosecution of the diaphoretic plan, warm bathing, local or general, with frictions and shampooings, should be employed; and ten grains of Dover's powder, with five of sulphate of quinine, given, once or twice every night, with hot infusions of balm, sage, sassafras, thoroughwort, or serpentaria. When, however, the powers of the system are greatly reduced, hot gin, or whiskey toddy, should be preferred; or one of those stimulants should be added to one of the infusions just mentioned. In the daytime, the patient should be kept in bed, or at least within doors, otherwise the perspiration will be checked. Many years ago, Dr. Allison, who had been Surgeon-General of Wayne's Army, told me that he had cured a female patient of anasarca, following on intermittent fever, by making her drink hot gin toddy, and dance daily to fatigue, in a warm room.

The excitation of the absorbents, has been stated as one of the objects to be accomplished. It may, indeed, be said to be the great end in view. But, it will be perceived, that very little remains to be said under this head; for all that has been advised, has contributed to fulfil this indication. Moreover, of medicines that act specifically on the absorbent system, we know but little. Nevertheless, it seems probable, that digitalis exerts an effect of that kind; as we seldom observe diuresis under its administration, except when there are dropsical effusions; which being absorbed, irritate the kidneys into increased secretion. There is litttle doubt, moreover, that iodine exerts an influence on the absorbent system; and hence, perhaps, in part, the efficacy of the hydriodate of potash, in the diseases under consideration. But there are means of a different kind, for promoting absorption—these are compression and exercise. As a general rule bandages will accomplish but little, till the absorption has commenced; when they should never be omitted, from both the limbs and abdomen, if the disease exist in both. Of the power of exercise over the absorbent system, there can be no doubt. When the abdominal distension is great, it cannot be taken, because the diaphragm

cannot descend; and if there be enlarged spleen, the difficulty will be much increased. But in the treatment of anasarca, the value of active, or sustained locomotion, will be decisive. Its effects are not limited to the action of the muscles upon the veins and lymphatics; but found, likewise, in the increased exhalation from the lungs from deeper and more frequent inspirations, which tend at once, to the elimination of the absorbed fluid, as if from the skin or kidneys; and to an improved condition of the impoverished blood. And this brings us to our last indication—the restoration of the flesh and strength of the patient.

Tonics, scarcely ever to be omitted, after the absorption of the serum has been effected, may, in many cases, be advantageously administered before. For example, when there is still a strong tendency to the recurrence of the febrile paroxysm, under slight exposure, or at quartan, or heptan periods, the bark alone, or combined with cream of tartar, will contribute to diminish effusion and promote absorption, as well as arrest the recurrence of the Fever. And when the effusion has suddenly become very great, with a feeble pulse, and cool or cold, bloodless, and semi-transparent skin, that medicine, and the proto-carbonate, proto-tartrate, or proto-sulphate of iron, are powerful means of arousing the system into increased absorption and secretion; while they contribute to augment the solid materials of the blood, and thus diminish the tendency to the effusion of serum into the cavities. Of the whole, the proto-carbonate has, perhaps, been most frequently employed; and there is much testimony in its favor. The iodide of iron, and the hydrocyanate of quinine are, also, well adapted to such cases.

The absorption of the serum having been effected, some of the medicines, just named, alternated with vegetable bitters, must be continued for a considerable length of time; great care being taken to keep the secretions in a healthy condition, by such means as are least debilitating. If *they* should fail, the effusions will recommence. At the same time, compression, frictions, and percussions, should be applied to the limbs; and kneading with the fists to the abdomen, should there be nothing in the state of the liver or spleen to forbid them. The diet of the patient should be mixed and nutritious, but not in excess; and he should take as much exercise in the open air as possible; having the surface of his body well protected.

SECTION VII.

PERIODICAL NEURALGIA.

I. Prevalence, Seasons, and Subjects.—Relying upon the information received of others, in connexion with my own experience, I may say, that neuralgia is decidedly the most frequent of all the consequences of autumnal fever. It prevails from North to South—everywhere, indeed, that our periodical fevers occur; but most, where intermittents are most prevalent

in comparison with remittents. Dr. Flournoy, of Lexington, Missouri, is the only physician who has told me that he had seen it *precede* the fevers of autumn. Its subjects, then, were probably those who had experienced attacks of the fever the year before. In general, it follows the annual epidemic; and, therefore, occurs chiefly in winter, and in spring, when vernal intermittents prevail. Occasionally, in certain localities, the number of winter cases is so great as to constitute it a kind of epidemic. From June to December, it is comparatively rare. It affects adults more than children, and men more than women; at least, this is what I have observed in my own practice. In some cases it becomes so established as to return with great frequency for years. Such, for a long time, was the condition of the late President Harrison, who resided in a locality infested with intermittent fever. Many years ago, I knew a Philadelphia merchant who travelled much in the West, and was obliged always to carry with him a quantity of the bark—the only medicine which afforded him relief.

II. Seats and Symptoms.—The true type of this painful affection, and by far, the most common, is known under the popular name of "sun-pain;" by the profession called periodical hemicrania. Its common seat is the right or left extremity of the forehead; but it often spreads over the entire orbit of the eye. Occasionally it runs back to the occiput, limiting itself to one side; but now and then it attacks the whole head; raging, however, with greatest intensity in the frontal region, and generally more on one side than the other. In some cases the skin of the forehead shows a considerable degree of hyperæmia; but I never saw evidences of inflammation. When it extends to the orbit, the eye becomes red, there is a copious secretion of tears, and considerable intolerance of light. It commonly shows a distinct quotidian, intermittent type; but, in some cases, is tertian; and now and then only remittent. I cannot say, that the paroxysms are never ushered in with a distinct chill; but do not recollect its occurrence in my own practice, nor has it been mentioned to me by others. Although the paroxysm may recur at any time in the twenty-four hours, its legitimate period is the latter part of the night or early in the morning; which, with its gradual increase during the forenoon, and its abatement or entire cessation toward night, has procured for it the name of "sun-pain." As it ceases, the redness of the eye, when that organ is involved, diminishes or disappears, and the tolerance of light returns.

As to constitutional symptoms, the liver, stomach, and bowels, are much less disturbed than in relapses of intermittent fever. The pulse is apt to be accelerated during the paroxysm, and, occasionally, there is some development of heat in the skin; but, in many cases, scarcely a single symptom of fever is present.

I must now enumerate other parts of the body in which this affection has been observed, by those with whom I have conversed; having also witnessed several of them myself.

In the North, Dr. Conant has seen it in various parts of the body; Dr. White saw one case in which it occurred about the middle of the humerus; Drs. Baker and Kitterage have seen it in the extremities; Dr. Wallace, in the teeth and side of the chest; Dr. Dresbach, in the sacrum, coccyx, and lower extremities. In one case it attacked the spermatic cord and testicles and the paroxysm alternated with others in the head, feet, and stomach. In the West, Dr. Price has frequently seen it attack the stomach—in one instance, that organ and the diaphragm, the paroxysms coming on regularly at midnight; Dr. M'Cullough has known it assail the os occipitis, the right side of the chest, and the wrist. To the South, Dr. Christian has had two cases in which it occurred in the splenic, and four in the uterine region; Dr. Kittral has twice seen it in the ear; Dr. Walkly had a case in which, under the influence of electro-magnetism, it shifted to a tooth, then to the external angle of the eye, then to the temple of the opposite side, and then to the arm, when it ceased; Dr. Barnett has seen several cases in which it fell upon the uterus, and, also, upon the tongue; Dr. M'Murtery has seen it affect the testicle and the liver; Dr. H. C. Lewis saw a case in which, after a white swelling of the knee-joint, it attacked the gastrocnemii muscles of the same limb, and returned the next autumn in the same part. Finally, it is a familiar fact, that the membranes of the jaws, and even the teeth, are often attacked. Thus, I have seen the pain of decayed teeth return at regular diurnal periods.

In addition to these citations, which show that various parts of the body are affected, I may add, that many cases of what, from their history, are called chronic rheumatism, have such diurnal or nocturnal exacerbations as should, perhaps, entitle them to a place in the catalogue of neuralgias.

Although the affections we are now studying very commonly follow attacks of autumnal fever, many cases do not. They depend, however, on the same cause, but occur without the intervention of the Fever. This is proven by their prevailing in the same places, having the same symptoms, and being cured or relieved by the same treatment. In general, the cases which have not been preceded by fever, are of the mildest grade. The disease we are now considering, doubtless attacks many parts of the body, not highly endowed with sensibility, and disturbs their functions, without giving the acute pain of neuralgia. Such cases may be detected by their periodicity, and the absence of the signs of inflammation. Professor Gross, whose popularity as a physician equals his fame as a surgeon, has, as he informs me, met with such cases, from the country around Louisville; and they have also occurred in my own practice.

III. PATHOLOGY.—Periodical neuralgia, is a pain or aching of the white fibrous tissues; but sometimes of the red; and, perhaps, also of others. The nervous irritation is not generally, or necessarily, of that kind which invites blood into the part, though such a fluxion may be produced. A true inflammatory action is, however, not set up; for the irritation ceases, and

with it the hyperæmia, before the inflammation can be established. When it attacks the fibrous membranes of the cranium, it is sometimes mistaken for arachnitis; and I have seen the paroxysms become progressively worse under an antiphlogistic treatment. Why it is oftener seated in the extremities of the fifth pair of nerves, than any others, I cannot tell; but we have long known, that ordinary tic douloureux has its chosen seat in the same nerves. The reason that a part which is affected with periodical neuralgia, does not suffer organic changes, is to be found I suppose, in the absence of inflammation, the immediate cause of most lesions of structure. This negative character, taken in connexion with its periodicity, places the disease among the neuroses, and reveals to us the true character of intermittent fever, as far as the primary impression of the remote cause is concerned. It, also, teaches us why that fever cannot, in general, be arrested by means which only lower the excitement of the system; and why it readily yields to opium and quinine, when the system is brought, by depletion, into a state favorable to their action. But the disease, in both its febrile and its neuralgic stages is of a peculiar kind, and therefore, not every agent which acts powerfully on the nervous system, will arrest it.

IV. Treatment.—I know of no disease in the treatment of which our physicians are so unanimous, as of that now before us. From North to South it is essentially the same. Everywhere the sulphate of quinine is the popular remedy; and by nearly all it has been found infallible. But this infallibility, in many cases, is limited to an arrest of the paroxysms; which after a while may recur. In fact, this painful affection obeys the same laws as protracted and relapsing intermittent fever. By some physicians, the quinine is administered without any preparation of the system; while others always subject their patients to the operation of emetic and cathartic medicines. There are cases which do not, and others which do, require that preparatory treatment. As a general rule, the longer and oftener the disease has returned, the less is the necessity for those evacuants; and of the two, emetics are more beneficial than cathartics. Sometimes, when the quinine has failed before, it has succeeded after the operation of an active emetic. When the attack is violent, and distinctly marked with diurnal, or nocturnal paroxysms, opium is a valuable adjuvant to the quinine. Thus, a grain of that medicine, or ten grains of Dover's powder with ten of quinine, may be administered at bedtime; and another dose of the same kind before day in anticipation of the paroxysm; which it will generally avert, provided the patient continue in bed during the forenoon. But in some cases the proportion of opium may be doubled. The next night half the quantity of these medicines will be sufficient. In obstinate cases of long standing, a method not so prompt will be preferable. Thus, the bark in substance may be administered in drachm doses, three or four times a day. Or a compound of quinine, opium, and arsenious acid, as for relapsing intermittents, may be substituted for it. Dr. Vivian, of Missouri, assured

me that he had found the carbonas-ferri of much service in some cases of this kind. A variety of local applications have been made. In my own practice they have done but little good. Yet a blister to the nape of the neck has, occasionally, given immediate relief, the pain being seated in the face or head. Of other applications, over the affected part, Dr. Barnett, of Mississippi, and Dr. W. A. Davison, of Missouri, informed me, that they had seen veratria afford relief; that Dr. Talbot, of the latter State, has employed a saturated alcoholic tincture of stramonium seeds with advantage.

The article AUTUMNAL FEVER is now brought to a close. It has extended through many pages; but a smaller number would not have sufficed, to present even an outline of its etiological and therapeutic history through so wide a geographical range as that of the southern half of our Interior Valley, in almost every part of which it is an annual endemio-epidemic. Of all our diseases, it is the one which has the most intimate relations with soil and climate—that, in which peculiarities, resulting from topographical and atmospheric influences, are most likely to appear. Hence it was chosen, to stand next to the Book of General Etiology as illustrating better than any other disease, the importance of the facts which make up that Book. It is, moreover, the *great* cause of mortality, or infirmity of constitution, especially in the southern portions of the Valley, and therefore, entitled to severe and patient attention. What I have collected and presented has required more labor than many of our brethren might suppose; and yet, they will not, perhaps, realize as fully as I do myself, how much must be added—how many errors corrected—before the pages through which they have travelled can be entitled to universal acceptance. Meanwhile, if what has been written should stir up a single young physician to a more diligent observation of the Fever, or save the life one individual, who might otherwise have become its victim, my labor will not have been in vain.

PART SECOND.

YELLOW FEVER.

CHAPTER I.

SECTION I.

NOMENCLATURE—DEFINITION—SOURCES OF INFORMATION.

I. NOMENCLATURE.—The term yellow fever is at once euphonic in sound and expressive of the most common characteristic appearance of a patient laboring under the disease now before us; the synonyms, vomito and *vomito prieto*, or black vomit, are not likely to supplant that name, wherever the English language is spoken. There are physicians, however, who prefer the epithets bilious yellow fever, and malignant bilious fever; having convinced themselves that this fever is but a modification of autumnal fever. As the word bilious has long been appropriated to the last, I shall not employ it in this article; and to show that the two fevers vary beyond the limits of mere modification, it is proper, at the outset, to present a condensed statement of the diagnostic symptoms of yellow fever.

II. DEFINITION.—A summer and autumnal epidemic fever, of one chill, followed by a single hot stage, running through forty-eight or seventy-two hours; accompanied with pain in the head, back and legs; jactitation; red eyes; gastric irritability, and biliary derangements, terminating sooner or later in jaundice; the fever succeeded by a stage of apyrexia and comparative tranquillity, suppression of urine, hemorrhage from various parts of the body, black vomit, and death. When the patient recovers, the three latter symptoms do not commonly appear, and if he remain in the place where the fever was contracted, he generally enjoys an immunity from subsequent attacks.

In all the modifications, most of these symptoms are present; and in the absence of a majority of them, the case would not be acknowledged as yellow fever.

III. SOURCES OF INFORMATION.—I have never seen a case of yellow fever; but am not precisely in the condition of a historian, who might have only

printed works from which to compile. I have visited and studied the topography, hydrography, and climate of a number of the most infested localities; and what is of equal or greater advantage, enjoyed the opportunity of conversation with a great number of physicians, who had become familiar with the disease in all its aspects. A large part of the facts about to be presented was thus obtained; while the remainder have been drawn from publications by physicians resident in the region embraced in the plan of this work.

Thus it is our own yellow fever, that of the Gulf of Mexico, and tributary rivers, that will be here described; and if the description should not be true of the disease as found in all countries, it will be because it is true of that which prevails in our own.

SECTION II.

GEOGRAPHY AND CHRONOLOGY.

I. GEOGRAPHY.—The southern limits of yellow fever, like those of autumnal fever, lie within the tropics. At Vera Cruz and Havana it has long prevailed as an endemio-epidemic. From these cities around to New Orleans it has invaded every town, situated on the islands or estuaries of the Gulf of Mexico. Its prevalence has been chiefly below the thirtieth parallel; but it has once visited Memphis* on the thirty-fifth parallel, and prevailed there as an epidemic. If cases have now and then occurred in places further north, as Cairo, Paducah, and St. Louis, the disease had been contracted in some town lower down the river. Its favorite haunts are the Gulf coasts, and the delta and bluffs of the Mississippi.

Yellow fever is essentially a disease of towns and cities. The inhabitants of the country even within a few miles of a town where the disease is epidemic generally escape it; unless they venture within its sphere of prevalence. An epidemic invasion of the country is unknown; although it has happened that persons living in the vicinity of a town have sometimes suffered.

The fever is not confined to the land, but often breaks out among the crews of ships navigating the Gulf of Mexico, long after they have visited any port at which it was prevailing.

Nearly all the places in which yellow fever has occurred, were but little elevated above the level of the Gulf. At Xalapa, in the latitude of Vera Cruz, it is unknown, the altitude being 4330 feet. The mean annual heat of that city is the same with that of Natchez, 67° Fahr.; but while the summer temperature of the latter is 80·96°, that of the former is but 69·32°. At what point before reaching the altitude of Xalapa, the fever ceases to prevail, I am not informed. Along the Mississippi, one of the most elevated

* See Vol. I. p. 133.

spots at which it has appeared, is the summit of the knobs on which the upper parts of Vicksburg are built. The elevation, I do not know, but suppose it to be about 350 feet. That of Memphis, however, is estimated at 400 feet, and the disease as we have seen has occurred there once. This is the greatest elevation it has reached in the Mississippi Valley.

Yellow fever not only affects lowlands, but also water-side localities. With two or three exceptions it has prevailed in no place not visited by ships or steamboats. The exceptions are Opelousas, in Louisiana, and Washington and Woodville, in Mississippi. The last is about twelve miles from the Mississippi River, which is the greatest distance from a navigable water at which it has as yet appeared.

It deserves to be recorded, that while various places on the bayous or main trunk of the Mississippi, have been repeatedly invaded, the towns on Alabama River, lying in the same latitude and elevation, have escaped.

II. CHRONOLOGY.—There is some reason to believe that yellow fever has been a disease of the shores of the Gulf of Mexico, from Cuba round to Vera Cruz, since the first settlements were made upon them by Europeans; but as it is a civic rather than a rural disease, it was probably less prevalent in the infancy of the cities of the Gulf than in their more advanced and populous condition. I have not the materials for a notice of its early history in the cities just named. On the shores of the northern segment of the Gulf, the first notice of the disease was at Biloxi Bay, in 1702, and Mobile in 1705.* The next was in Pensacola and Mobile in 1765, when it prevailed as an epidemic.† As Capt. Romans believed it to be imported from Cuba, we discover that the disease prevailed on that island at that time. In fact, we learn from Lind, p. 168, that in other parts of the West Indies very violent fevers raged in certain localities, in the years 1765-6.‡ I have not met with any other printed or traditional account of the disease in that region, for the next thirty years, that is, down to the time of the first authentic notice of its occurrence in New Orleans, in 1796.§ Throughout that period, the principal villages were St. Marks, Pensacola, Mobile, Pascagoula, Biloxi, Bay of St. Louis, the Balize, New Orleans, Baton Rouge, and a few other settlements in and above the delta of the Mississippi. There was but little emigration to them; they had, with the exception of New Orleans, scarcely any commerce, and were composed chiefly of French and Spanish creoles, whose connexions were with the mother countries, where the records of yellow fever invasions are doubtless deposited, if any exist. Since the date just mentioned, that is, for more than half a century, the invasions of the disease have been noted; but of the majority, no histories have been preserved. They have been frequent, especially in New Orleans; and to save the reader

* Dr. Lewis, N. O. Medical Journal, Vol. 1, No. 4.

† A concise History of East and West Florida. By Captain Bernard Romans. New York, 1776.

‡ An Essay on the Diseases incidental to Europeans in Hot Climates, by James Lind, M.D., Philadelphia, 1811.

§ Dr. Carpenter.

from the unwelcome labor of travelling through a narrative, I have thrown the whole into a chronological table. It is not practicable to connect the authorities with this table; but after stating that I have collected and collated them with much care, I may mention the classes to which they may be referred. 1st. Printed accounts, which are in the hands of the profession. 2d. An examination of the registers of the great Charity Hospital, which begin, in an intelligible manner, with the year 1818. 3d. Conversation or correspondence with living physicians of all the towns and cities, except a few of the smaller, where it has appeared for a single time only.

The initial letters E. and S., affixed to the places named in the table, signify Epidemic and Sporadic; in reference to which I should observe, that as they do not represent fixed or definite degrees of prevalence, the information conveyed by them must be regarded as vague, and of the most general kind. Thus the word sporadic will indicate any degree of prevalence, from a few cases up to such a number, as might justify the epithet epidemic, or even render it the more proper of the two. In treating of the disease as it has occurred in the different towns, greater precision will be attainable.

Chronology of Yellow Fever in the Valley of the Mississippi River and its Borders.

Endemic; Havana, Vera Cruz.

1702. Biloxi; Dr. Lewis, N. O. Med. Journal, No. 4.

1705. Mobile, E.; Dr. Lewis, N. O. Med. Journal, No. 4.

1765. Mobile, E.; Bernard Romans; Pensacola, Lind., E.

1791. Prevailed: Mr. Relf. N.B. See Histoire de la Louisiane, par Gayani, Secretary of State, 1704–06.

1796. New Orleans, E.

1799. New Orleans, E.

1800. New Orleans, E.; Barton Am. Journal.

1801. New Orleans. Prevailed more or less. Mr. Mansell White had it. Knew of several deaths.

1804. New Orleans, E.

1811. New Orleans, E.; Pensacola, E.; St. Francisville, S.

1812. New Orleans, E.

1817. New Orleans, E.; Baton Rouge, E.; Natchez, E.; Whitsell's Landing, twenty miles below Natchez.

1818. New Orleans, E.

1819. New Orleans, E.; Mobile, E.; Baton Rouge, E.; Natchez, E.

1820. New Orleans, E.; Bay of St. Louis, E.

1821. None. Mobile, S.

1822. New Orleans, E.; Mobile, S.; Pensacola, E.; Blakely E.; Baton Rouge, E.

1823. Two cases. Charity Hospital, S.; Natchez, E.; Coonsville, E. Dr. Thomas says positively no Yellow Fever in New Orleans.

1824. New Orleans, E.; Mobile, S.; Key West, E.

1825. New Orleans, E.; Mobile, E.; Natchez, E.; Washington, E.

1826. New Orleans, S.; Apalachicola Bay.

1827. New Orleans, E.; Mobile, S.; Pensacola, E.; Baton Rouge, S.; Natchez, S.; Bayou Sara, S.; Vicksburg, S.

1828. New Orleans, E.; Mobile, S.; Memphis, E.

1829. New Orleans, E.; Baton Rouge, E.; Plaquemines, E.; Natchez, S.; Bayou Sara and Francisville, E.; Bay of St. Louis, Army, E.; Mobile, E.; Key West.

1830. New Orleans, E.

1831. Three cases Charity Hospital, S.

1832. New Orleans, E.; Mingled with cholera. Reported as cholera in Charity Hospital. Many testify to its prevalence.

1833. New Orleans, E.; Plaquemines, S.

1834. New Orleans, E.; Pensacola, E.

1835. New Orleans, E.

1836. Seven cases, Charity Hospital, S.

1837. New Orleans, E.; Mobile, E.; Natchez, E.; Plaquemines, S.; Vicksburg, S.; Opelousas, S.

1838. New Orleans, S.; Mobile, S.;

1839. New Orleans, E.; Mobile, E.; Pensacola, E.; Bay of St. Louis, S.; Pascagoula, S.; St. Joseph's, S.; Bay of Biloxi, S.; Tampa Bay, S.; Franklin, E.; New Iberia, E.; St. Martinsville, S.; Opelousas, E.; Thibadeaux, S.; Donaldsonville, S.; Plaquemines, E.; Baton Rouge, E.; Bayou Sara, E.; Waterloo, E.; Fort Adams, E.; Port Hudson, E.; Natchez, E.; Vicksburg, E.; Alexandria, E.; Nachitoches, E.; Galveston, E.; Houston?

1840. Two cases, Charity Hospital, S.

1841. New Orleans, E.; Mobile, S.; Pensacola, E.; Port Hudson, E.; Vicksburg, E.

1842. New Orleans, E.; Mobile, S.; Opelousas, E.

1843. New Orleans, E; Mobile, E.; Donaldsonville, S.; Baton Rouge, S.; Vicksburg, E.; St. Francisville, E.; Rodney, E.; Port Hudson, S.

1844. New Orleans, S.; Woodville, E.; Mobile, S.

1845. New Orleans: one case in the Charity Hospital: absent or very nearly so.

1846. New Orleans. Slightly epidemic.

1847. New Orleans. Extended and violently epidemic.

1848. New Orleans. Scarcely epidemic.

SECTION III.

LOCAL HISTORY.

Under this head I propose to give some account of the origin and preva-

lence of yellow fever in the various places enumerated in the foregoing chart. I shall endeavor to ascertain, as far as may be practicable, from accounts which are very generally defective, and still more frequently conflict with each other, the circumstances, at each place, under which the fever has made its appearance. *Prima facie*, it might be supposed that a volume would be necessary to what is here proposed; and so it would if authentic materials for an account of every invasion of the disease, in the places enumerated in the table, could be obtained; but unfortunately they cannot, for in numerous instances the rise of the fever was not critically observed and registered at the time, and I feel quite certain that I have not been able to collect all the facts that have been recorded. In some instances, I have only been able to obtain the accounts of partisans on one side, and have not therefore the means of knowing what was suppressed, or what was unconsciously exaggerated.

There are three cities in which the disease has prevailed far more than all the rest taken together; these are Vera Cruz, Havana, and New Orleans.

From the want of facts, I cannot attempt to give a history of its prevalence in the two former; but may remark that if the fever were originally imported, it has long since become endemic, and prevails every year, in all seasons, except winter. It is otherwise with the last, where it seldom reigns for more than four months, and in some years is entirely absent.

In reference to the northern arc of the Gulf, New Orleans is, however, not more the commercial emporium, than the notorious haunt of yellow fever. In some years, the city only is visited, all the surrounding towns escaping; but it scarcely ever occurs in any of them without prevailing in it, and this unenviable pre-eminence suggests that the special histories should begin with that city. In giving them, reference will or may be made to the topographical descriptions in Book First, which will not be here repeated.

CHAPTER II.

LOCAL HISTORY—NEW ORLEANS.

SECTION I.

CONDITION OF THE CITY—PREVALENCE IN.

I. As New Orleans of all the towns north of Vera Cruz and Havana, is the one which has been oftenest scourged by yellow fever, a careful study of its topography, climate, police, commerce, and population, is indispensable to an inquiry into the origin of that fever. For the topography the reader is referred to the Article, New Orleans, Vol. I. Sect. III. Chap. V. Part I. of Bk. I. (p. 97), where it will be seen, that a cypress swamp, into which the

sewers and gutters of the city discharge their foul contents, presses hard upon one side of the city; while on the opposite side, there is a large line of wharves and landings, for ships, steamers, and flat boats, rendering the batture, and sloping, submerged bank, exceedingly foul. It is on this side of the city that yellow fever generally makes its appearance. In referring to the topographical conditions which it has been affirmed are productive of yellow fever in other places, we find those of New Orleans every way answerable to the demands of that hypothesis.

II. CLIMATE.—The climate of New Orleans may be estimated by data drawn from Part II. Book I. In collecting them, it is not necessary to go beyond summer and autumn, as the fever is nearly limited to those seasons. The following table embraces all that is necessary to show the temperature, winds, rainy days, and quantity of rain in the respective months of those seasons.

Months.	Mean temperature.	Winds. Days.		Rainy days.	Rain in inches.	Temperature at Havana, for comparison.
		Southern.	Northern.			
June,	83·09°	15.7	3·4	7·7	3·182	84·12°
July,	83·90	14·0	4·3	12·0	5·703	84·30
August,	83·27	12·7	11·4	9·0	4·466	85·84
September,	80·23	13·0	8·9	13·3	3·918	83·04
October,	71·69	10·7	14·7	4·8	3·926	79·52
November,	60·81	8 6	14·9	8·3	4·218	75·56

No observations have yet been published on the hygrometry of New Orleans, but the study of its hydrography and its position in reference to the Gulf, will show conclusively, that the complement of its dew point must be small; that, in fact, its atmosphere is, at all times, like that of the adjacent Gulf, nearly saturated with vapor.

In examining the table we find that a daily mean heat of 83° precedes for several weeks, the ordinary outbreak of fever; but the disease acquires its greatest violence in September, when the temperature has fallen 3°, and often rages with severity in October, when the temperature has sunk 12°. Thus it is not the direct action of a hot atmosphere on the body which produces the fever, though that action may predispose to it.

During the months of June and July, in which the fever is generally developed, the southern winds prevail greatly over the northern; in August and September they approach much nearer to equality of prevalence; in October the northern predominate; but the fever often continues violent in that month, when the northern winds are equal in prevalence to the southern in July. Thus, it is not the impress of the southern winds upon the body which awakens the fever; and when it continues to prevail as an epidemic after the northern winds have set in, they cannot be regarded as originating, simply as exciting it in the predisposed.

The number of rainy days in July and August, during which the fever is

advancing to its acme, is twenty-one;—the number in September, when its range is greatest, is larger than in either of the preceding months; in October, when the fever is declining, the number is much less. The quantity of rain is greatest in July—least in September; yet the fever prevails more in the latter than the former, showing that whatever influence rain may exert is indirect.

If we compare the temperature of New Orleans with that of Cuba, we find that in the months of June, July, August, and September, it rises above 80° at each place. The average of the four is at New Orleans 82·62°, at Havana 84·32°—difference but 1·7°. Hence it appears that if a high temperature can directly or indirectly generate the fever in Havana, it may be so generated in New Orleans. The relation between such a temperature and the rise of the fever is rendered more obvious by referring to the mean temperatures of April and May, which in New Orleans are 73·71° and 78·96°, while in Havana they are 78·98° and 83·58°. Now the fever does not occur at the former city in those months, but does prevail at the latter. A similar observation applies to the temperature of November, which at New Orleans, sinks as low as 60·81°, with a cessation of the fever, but in Havana it keeps up to 75·56°, and the fever continues to prevail, till it is arrested by a winter mean heat of about 70°. On the whole we are led to the conclusion that a heat of 80° or upwards is necessary to the rise of the fever, but that having become prevalent, it will continue under a lower temperature, than that which was necessary to its production.

III. COMMERCE.—Being the great commercial city of the Gulf of Mexico, New Orleans is visited by ships from nearly all parts of the world. They arrive at all seasons of the year, from most of the ports of the West Indies, but above all from Havana, where as we have seen the disease is either endemic, or a naturalized annual epidemic. From May to November, indeed, it is scarcely ever absent, and throughout that half the year ships after a short voyage are constantly arriving at the port of New Orleans. The same is true of the ports of the northeast coast of South America, of Central America, and Mexico; above all of Vera Cruz, where the prevalence of the disease is almost as constant as at Havana. When these vessels, like all others, arrive at one of the mouths of the Mississippi, they are detained a few hours or a day, to be piloted across the bar, and to show their clearances to the boarding officer, when they are immediately taken in tow by a steamer, and in less than a single day, are discharging cargo on the quay of New Orleans.

Before the sale of Louisiana to the United States, which was consummated in 1804, the commerce of New Orleans was quite limited, but even then it was as great or proportionably greater than that of Havana, though in absolute amount much less than at the present time. After Louisiana became incorporated with the United States, the commerce of the city increased, except during two years, including a part of 1807 and 1809, when it was

ntine was in the year 1821, when vessels from certain ports were re-
l to stop at the English Turn, eighteen miles below the city.

us it appears that New Orleans is and has always been exposed, in an
nt degree, to whatever dangers there may be in commerce; and that
fever is transmissible by ships she must of necessity have been
ged by it many times.

. POPULATION.—It is well known that the victims of yellow fever are
y immigrants. For eighty-six years after its settlement, that is up to
riod of the cession of Louisiana to the United States, the migration
Europe was so small that the whole population amounted only to 8000;
appears from the general table that the fever but seldom prevailed.
next thirty-six years up to 1840, the population increased to 191,102;
ting an immense immigration, and throughout that period, the fever
een correspondingly prevalent. But to show more conclusively the
n between immigration and the prevalence of the fever I will go into
llowing details:—

winter and spring a countless number of persons from the interior of
alley visit New Orleans on business, or for pleasure, or through
ity, but a very large majority of them leave it before the setting in of
ckly season. Nevertheless there is an annual autumnal addition to its
ation from other parts of the United States as well as Europe. The
ean immigrants, chiefly Irish and Germans, are generally poor; and
bly ignorant of the danger they incur thereby, embark at such times
bring them to New Orleans in summer and autumn, no less than in
r and spring. Most of the Germans ascend the Mississippi, and a
n of the Irish, though considerable numbers remain. The evidence
this is to be found on the books of the Charity Hospital. In 1844,
ears by the annual reports of the administrators of that most benevo-

three years being the term of distinction. In those two years the admittances numbered 9421, of which 7348 had been in the city less than three years. If we apply this ratio of about seventy-eight per cent. to the whole number, 64,034, we have 49,944, or a fraction less than 50,000, making an annual average of 3571, of patients who had been in the city less than three years. During the fourteen years nearly 7000 patients were admitted for yellow fever; and as, from what is well known of that disease, the whole of these may be assumed to have been of the 50,000 strangers who had resided in the city less than three years, we see that yellow fever carries to the hospital nearly a seventh part of all the new-comers who find their way thither. From the registers of the Institution, about one half of those who are admitted for that disease die, and consequently 3500 poor strangers have died in that establishment from yellow fever, in fourteen years. Of the number of cases or deaths from the fever in the private hospitals, and the practice of the physicians of the city during that period, I cannot speak; but enough has been said, I think, to show that the chief havoc of the fever, is among the unacclimated. A large proportion of these patients are men (for comparatively but few women immigrate to New Orleans, especially from Europe), and the majority of them are employed in the streets, and on the wharves about the shipping. Many of them, indeed, are boatmen, who descend the river in flat-boats in summer and early autumn.

This account of the population of the city, shows that it fulfils the conditions considered requisite to the prevalence of the fever in those tropical countries where it seems to be naturalized, or is at least of annual prevalence; that is, that it includes numerous strangers from higher latitudes, the majority being poor, and leading lives of exposure and dissipation.

SECTION II.

TIME OF COMMENCEMENT—AND PREVALENCE IN DIFFERENT YEARS AND MONTHS COMPARED WITH AUTUMNAL FEVER.

I. COMMENCEMENT AND MORTALITY OF THE FEVER IN DIFFERENT YEARS.—The following table was principally compiled from data collected by a careful examination of the books of the Charity Hospital, in my second visit, 1844. Its object is to show the period of the year in which the fever begins, with the number of deaths compared with the number of admissions. A further object is to compare the admissions and deaths from autumnal fever, with those of yellow fever. Many of the earlier registers, not to go further back than the year 1818, were kept so imperfectly, that the table necessarily presents a number of blanks.

TABLE.

YEARS.	YELLOW FEVER.		AUTUMNAL FEVER.		Date of the first twelve cases of Yellow Fever.
A. D.	Admissions.	Deaths.	Admissions.	Deaths.	
1818	43	Imperfect.	Imperfect.	Imperfect.	Aug. 30 to Sep. 8.
1819	141	"	"	"	May 7 to July 28.
1820	122	"	"	"	July 21 to Aug. 9.
1821	None.	None.	None.	"	None.
1822	349	Imperfect.	358	"	Sep. 1 to 7.
1823	2	2	424	58	Aug. 23 to Sep. 11.
1824	176	Imperfect.	438	22	Aug. 4 to Aug. 26.
1825	92	59	283	22	June 23 to July 12.
1826	23	5	465	34	May 18 to July 11.
1827	388	265	449	18	July 19 to 30.
1828	305	Imperfect.	355	Imperfect.	June 18 to July 25.
1829	452	"	334	"	May 23 to June 18.
1830	416	158	679	52	July 15 to July 29.
1831	3	0	847	Imperfect.	June 9 to Sep. 13.
1832	36	22	534	33	Aug. 15, unknown.
1833	887	449	664	69	July 12 to Aug. 7.
1834	Imperfect.	Imperfect.	Imperfect.	Imperfect.	Aug. 28 to Sep. 30.
1835	505	284	2152	135	Aug. 23 to Sep. 1.
1836	7	5	1430	12	Aug. 24 to Oct. 4.
1837	1194	613	1384	28	July 24 to Aug. 6.
1838	24	Imperfect.	Imperfect.	Imperfect.	Aug. 25 to Oct. 2.
1839	1086	452	1153	20	July 23 to Aug.
1840	1	0	1890	45	July 25.
1841	1113	594	956	30	July 27 to Aug. 12.
1842	410	214	1323	30	July 30 to Aug. 23.
1843	1053	487	309	26	July 5 to July 29.
1844	150	83	1980	76	
1845	1	0	1688	11	
1846	148	89			
1847					July 5 to July 17.
1848	1234	420			

Several conclusions are deducible from this table.

1. We find that yellow fever, for the twenty-five years preceding 1843, classing the years in which the number of admittances into the Charity Hospital did not exceed 7 with that in which none was received, was absent only 5 years. But although it is highly improbable that the disease could be sporadic in the city without any patient being sent to that establishment, still it may have happened, and therefore, it cannot be said with positiveness that there was a single year of the twenty-five in which the disease did not occur to some extent. On the other hand it may be that the few cases which were received in four out of those five years were from ships, and had been generated elsewhere, which if true, would leave us a prevalence of twenty years out of twenty-five. Granting this, we find that while autumnal fever prevails every year, yellow fever occurs four years out of five—approaching in this respect to an endemic.

2. In casting along the columns of admittances we find the numbers becoming larger and larger, but this does not indicate an increasing prevalence of either yellow or autumnal fever, but results from the constantly

augmenting population of the city. Indeed it is obvious, that in proportion to the population, the number of admittances from both diseases was less in the second than the first half of the twenty-five years; from which, if it did not result from the increase of private hospitals, we may believe both fevers to be on the decline.

3. Had a case in the month of May been reported in one year only, it might have been rejected as an error, but when we find that entry repeated twice in subsequent years, it seems necessary to admit the whole; which we may do with the less hesitation as we find that it commenced three times in the month of June. Nevertheless we perceive, in reference to the month of May; that it was in the different years nearly twenty-six, fifty-four, and eighty-two days (average fifty-four days), before the first twelve patients were admitted; and in reference to June, nineteen, thirty-seven, and ninety-six days (average fifty days) before that number were entered. In ten of the twenty-five years, that is forty per cent., the first admissions were in July, and the average number of days before the twelve patients were entered was seventeen. In eight years or thirty-two per cent. of the whole term, the first admissions were in August, and the average duration of the time in which the first twelve were brought to the hospital was twenty-four days. In a single year only was the first admission delayed until September, when it occurred on the first day of the month, and by the 9th, twelve patients had been brought in.

Thus we see that the time through which, in the twenty-five years, the first case occurred, was from the 7th of May to the 1st of September, a period of nearly four months. But July is the month in which not only the greatest number of invasions were made, but in which the early cases succeeded each other most rapidly. Next was August, nearly equal to it; and then May, June, and September. The general fact then is, that the yellow fever of New Orleans begins chiefly in July and August—the hottest months of the year; while in the South, autumnal fever begins, as is well known, in the latter part of April, or early in May, and is sometimes of epidemic prevalence as early as June.

If we examine the table to ascertain whether there is any connexion between an early or a late appearance of the Fever and its subsequent violence or prevalence, we find none; for, in some years, when it began early, it proved only sporadic, as in 1825, '26, and '31; while in others, as in 1828, and '29 it was epidemic; and again in 1817, '23, '32, and '36 it began late, and prevailed but little; while in 1822, '24, and '35, a late beginning was followed by epidemic prevalence.

4. Years of sporadic and epidemic prevalence do not always alternate; but in this respect there is great irregularity. In 1821 there was none, but in 1822 a mortal epidemic, to which succeeded four years of sporadic prevalence, then four of epidemic prevalence, then two of sporadic, and then one of a remarkably epidemic character. From 1835 to 1843 inclusive,

there was however a regular alternation; though 1842 would have passed for a year of decided prevalence, had it not been placed between two, remarkable for their great mortality. The explanation usually and perhaps correctly given of these alternations, is that after a great epidemic there are but few susceptible persons to be acted upon—many have died—others have fled and do not return, and the tide of immigration has been temporarily checked.

5. The table shows that different epidemics are not equally mortal. Thus in 1825, fifty-nine out of ninety-two, and in 1827, two hundred and sixty-five out of three hundred and eighty-eight died, but in 1830, only one hundred and fifty-eight out of four hundred and sixteen were left. In 1833 the deaths were within a fraction of half the admissions; in 1837, they considerably exceeded half; but in 1839 fell far short of that proportion. In deducing a ratio of mortality from all the terms in the table, it may be stated at fifty per cent., or one half. This is undoubtedly a large proportion, but the patients are generally advanced in the disease, often indeed moribund, before they are sent to the hospital. Many of them in fact are taken there to die, that they may be buried at the public expense.

Nothing in the table is more striking than the low rate of mortality of autumnal fever compared with that just given. It does not exceed five per cent., or a tenth part of the mortality of yellow fever. Thus if one hundred patients with the latter disease were taken there, fifty would die; while of the same number affected with the former, there would be only five deaths.

II. Relative Prevalence of Yellow Fever and Autumnal Fever in the Different Months.—The following table compiled from the registers of the Charity Hospital, gives the average monthly number of patients with yellow fever and autumnal fever, for six years. In four of these years both diseases were epidemic; in two of them yellow fever was absent, or slightly sporadic.

Mean of 1839, '41, '42, '43. Both fevers epidemic.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.
Yellow Fever, . . .	0	11	223	404	131	58	6
Autumnal Fever, .	62	182	159	108	124	135	91
Mean of 1838–'40. Yellow Fever nearly absent.							
Yellow Fever, . . .	0	0	2	4	6	1	0
Autumnal Fever, .	130	225	207	254	259	136	91
United Averages.							
Yellow Fever, . . .	0	11	225	408	139	59	6
Autumnal Fever, . .	192	407	366	362	383	271	182

1. This table is instructive. We see that August, September, and October are the true yellow fever months; but that the disease continues to occur in November. In the order of prevalence the months stand September, August, October, November, July, December, and June. Taking the

years in which yellow fever was absent, the order of prevalence of autumnal fever was October, September, July, August, November, June, and December; but taking the years in which yellow fever was epidemic, the order of prevalence of autumnal fever was July, August, November, October, September, December, and June. Thus, we see, that yellow fever exerts a disturbing influence on the prevalence of autumnal fever, by reducing the number of cases in August, September, and October. This was so strikingly the case in one of the years, 1839, that I am tempted to present its results.

Months.	Yellow Fever.	Autumnal Fever.
June,	00	81
July,	11	146
August,	481	65
September,	360	89
October,	129	88
November,	62	152
December,	00	131

2. These statistics seem to indicate two distinct morbific influences, coexisting and operating at the same time, in the production of two forms of fever; but is not this an assumption? Do not both constitute but a single epidemic, becoming, on the approach to the equinox, more malignant, and with this increase of violence, presenting some new symptoms? An affirmative answer to this question would likewise be an assumption. Meanwhile we are bound to admit that, with due allowance for errors of diagnosis in the hurry of an epidemic, the cases which have been denominated yellow fever by the numerous experienced and intelligent physicians of the Charity Hospital, some of whom believe in the foreign and others in the domestic origin of that fever, were really different in their symptoms from those which were called autumnal fever—especially diverse in the phenomena which preceded death, in the post-mortem appearances, and in the ratio of mortality. Which facts being admitted, the question at once arises, why this difference? and whether it does not imply the action of some modifying cause in conjunction with that which produces ordinary autumnal fever; and thus the ætiological inquiry only assumes a new direction.

3. It appears that in the years embraced in the foregoing tables, there were more than half as many cases in December as in July; yet we hear much more about yellow fever in the latter than the former of these months. The explanation is, perhaps, that the first cases occasion great alarm, and lead to exaggerated rumors of the prevalence of the fever; but, after it has declined through November, and the panic has died away, the December cases occasion but little emotion in the public mind, and are often not noticed. If a few persons remain too long in the city after the month of June, a much larger number return too early, and are liable to be taken down, after the disease is supposed to be entirely gone. Finally, some of the cases in December are relapses. Of this kind, perhaps, are the occa-

sional cases in January and February, of which I found notices in the records of the Charity Hospital. In March and April an entry is here and there to be found; but, on the whole, the first four months in the year are most exempt;—or, to express the fact in a more comprehensive manner, we may say, that the fever occurs between the summer and winter solstices, and is most prevalent about the autumnal equinox—most entirely absent, about the vernal. Thus it never reappears in spring, after having been epidemic in autumn, in which respect it departs from the well-known law of autumnal fever.

SECTION III.

ANNALS OF THE FEVER AT NEW ORLEANS.

I. From the Beginning of the Town in 1717 to 1790.—In this section I propose to give such notices of the annual recurrence of the Fever in New Orleans, as a scanty supply of materials will permit. For the first hundred years after the settlement of the city no hospital records were kept, and it is quite impossible to find out with precision how many times it prevailed.

As bearing on the question of the importation of the Fever from Africa, it may be stated, that on the first year after the settlement of the place, two shiploads of negroes, amounting to 500, were introduced.* Nothing is said, however, as to yellow fever. Fifty years afterwards, according to Norman,† who does not, however, cite authority for the fact, the *first* visitation of the Fever followed on the arrival of a British vessel from the coast of Africa, with a cargo of slaves. Dr. Thomas fixes the *first* invasion of the fever in 1796, or twenty-seven years later.‡ This, however, is a mistake, as we shall presently see. Throughout the whole period, the commerce of the city was exceedingly limited; and up to the year 1788, seventy years after the first settlement, the population amounted only to 5338, including negroes. On the whole we may conclude, that thoughout the period mentioned the town suffered but little, if at all, from that malady. Since the year 1790, it has become gradually more and more frequent and formidable; but through the first twenty-seven years, the accounts of its invasions are meagre and unsatisfactory.

II. Season of 1791.—The first invasion of the Fever of which I have an authentic account, was in this year. My informant, Richard Relf, Esq., one of the most venerable citizens of New Orleans, soon after his arrival experienced an attack; and three of his fellow-lodgers fell victims to the Fever. After his recovery he saw many cases, and, in subsequent years

* Martin's History of Louisiana, vol. i. p. 210.
† New Orleans and Environs, p. 62.
‡ Essai sur la Fièvre Jaune d'Amerique, p. 70.

became so familiar with it, that he could not be mistaken as to the character of the disease. There was no suspicion of its having been imported.

III. Season of 1796.—Of the origin of this epidemic, Dr. Thomas* has given the following account:—

"It is said that yellow fever had never been observed in New Orleans before 1796. Up to that time the city was of no great extent, and was surrounded by trees, which by their shade, prevented the putrefaction of the water covering the ground at their roots, and which absorbed to a great degree (a quality which they are known to possess) the deleterious miasm.

"The Spanish baron, Carondelet, then governor of Louisiana, caused a number of works to be executed about this time, of which the principal were, 1st. The construction of a canal two miles long, which still bears his name, and terminates in New Orleans in a basin—(large enough to contain a great number of small vessels of from 25 to 100 tons burden, dug exactly in the place in which the old cemeteries were situated)—and at the other end, in a small river emptying into Lake Pontchartrain. 2d. Fortifications, surrounded by ditches. 3d. A clearing away, for a considerable distance, of the trees which surrounded the city. This laid bare a considerable extent of marshy land, which, dangerously influenced by the solar heat, soon disengaged pestiferous effluvia in abundance.

"These works, and particularly the canal, were finished in 1796, as is shown by the records of the city, from which I have obtained these details; and it is exactly at this time that the first epidemic of yellow fever occurred, which carried off, at its inception, almost all the laborers engaged on the works, as eye-witnesses testify.

"The disastrous results of disturbing the soil have been demonstrated anew, in the epidemic of Natchez, in 1819. Dr. Prouens, a well-educated physician, who practises medicine there, wrote on this subject to the Medical Society of New Orleans (of which he is a correspondent), that the obvious cause of this epidemic, was not an importation of it by the river, as the contagionists pretend; for the malady began to show itself in a place quite remote from the port, and in the immediate vicinity of some very considerable excavations, which had been made a short time before for the purpose of levelling the streets.

"The old inhabitants of St. Domingo have assured me, that many analogous examples were known to have occurred in that island from the same cause.

"It will be seen (further along), in reading the description of the epidemic of 1822, that excavations of the earth may be considered as one of the causes which fixed its limits."

The opinion that the Fever was of local origin seems at that time to have been controverted; for the late Prof. Carpenter,† copying from the Louisiana

* Essai sur la Fièvre Jaune, p. 70. † Sketches from the History of Yellow Fever, p. 13.

er for November, 1820, says, "It was traced to a vessel which had ht it."

. Season of 1799.—Prof. Carpenter,* again copying from the paper noted, says there was "what was considered proof of its importation." e been informed by Mr. John McDonough, who arrived the year before, t prevailed violently; and was then spoken of as a disease of constant l recurrence.

Season of 1800.—The only notice I have seen of this year, is in a nthetical) sentence of Dr. Barton's paper, on the Epidemic of 1833, represents the Fever as having constituted a "great" epidemic; and asterly winds prevailed for three months.†

. Season of 1801.—Mr. Maunsel White, who came to the city in ear, has informed me, that he had the Fever, and knew of many fatal

I. Season of 1804.—This was the first autumn after the transfer of iana from France to the United States. The population of the city as yet, risen only to 8,000. Prof. Carpenter merely refers to its nce;‡ but I was informed by Mr. McDonough, that it prevailed with ee.

II. Seasons from 1807 to 1816 inclusive.—I have thrown these ears into one group, because the commercial intercourse between Orleans and the more southern cities of Havana and Vera Cruz was or less interrupted, first by an embargo, and second, by the war with Britain. The following table presents the results of a diligent inquiry he history of the Fever in those years.

1807,	embargo,	yellow fever,	none.
1808,	"	"	none.
1809,	no embargo,	"	prevailing.
1810,	"	"	none.
1811,	"	"	prevailing.
1812,	war,	"	prevailing.
1813,	"	"	none.
1814,	"	"	none.
1815,	no war nor embargo,	"	none.
1816,	"	"	none.

are not been able to find any evidence of the occurrence of the Fever seven years of this table which are marked as exempt. It will be ved that in five of those years, there was neither embargo nor war, o there was an embargo, in three war. Of the three years in which ever prevailed, two were without embargo or war, and one with war. ese visitations we have the following authorities.

D. 1809. Prof. Carpenter§ notes it as occurring. Dr. Huestis‖ speaks

* Notes from the History of Yellow Fever, p. 14. † American Journal, vol. xv. p. 34.
‡ Ibid, p. 15. § Ibid, p. 17. ‖ Topography and Diseases of Louisiana, p. 89.

of yellow fever in connexion with scurvy among the troops stationed at Terre-aux-bœufs, fifteen miles below New Orleans. But as he regarded that fever as identical with autumnal remittent fever, his notice is not conclusive. I have been informed, however, by Alfred Hennen, Esq., who reached the city in that year, that yellow fever certainly did prevail; a statement confirmed by Mr. C. W. Dewey.

A.D. 1811. My authorities for the prevalence of the Fever this year are Mr. McDonough, Mr. Hennen, and Mr. William Flowers, all most reliable observers. The last of these gentlemen informed me that the Fever was ascribed by many to an extensive breaking up of the streets preparatory to paving them. Prof. Carpenter notes its occurrence, but is silent as to its cause.*

A.D. 1812. Dr. Huestis, in the work just quoted, p. 117, writes: "Three companies of the first regiment of artillery were then stationed at the barracks in that city, of whom a great portion died with the yellow fever and from the effects of mercury." To this explicit statement, I may add, that Judge Chamberlain of Mobile informed me, that he himself experienced an attack of the fever in the autumn of that year, being then a newcomer in New Orleans. The suspension of commerce consequent on the declaration of war, gives importance to these statements; which conflict with those of Prof. Carpenter, who informs us† that there was no yellow fever in the city this year. According to the recollection of Mr. Maunsell White there was none. I have placed 1808 among the years of exemption, but ought to state, that Mr. C. W. Dewey assured me that the fever did occur in that year.

A.D. 1816. In connexion with the absence of the fever this year it is proper to place the following extract from a report of a committee of the *Société Médicale de la Nouvelle Orléans.*‡

"The year 1816 was signalized by a rupture of the banks of the river, followed by an inundation of nearly the whole region between the left bank of the river and Lake Pontchartrain. This event occurred at the opening of spring, and the waters remained on the surface more than six weeks, leaving on its surface when they drained off a thick deposit of slime; nevertheless, notwithstanding the heat which afterwards prevailed, the season was one of the most salubrious."

IX. SEASON OF 1817.—This year of fever was fatally epidemic. According to Prof. Carpenter§ it was introduced from Havana; whence a British vessel arrived on the 18th of June, with cases of the fever. But it did not spread into the city. On the 10th of July, another vessel reached New Orleans from the same port, with many cases on board; the disease, however, did not become epidemic till after the middle of that month; that

* Sketches from the History of Yellow Fever, p. 17.
† Sketches, p. 17.
‡ Journal de la Soc. Méd. No. 4, p. 157.
§ Ibid. p. 17.

; winter the legislature passed a quarantine law.

Season of 1818.—Notwithstanding the quarantine directed by the
f the previous winter, forty-three patients were admitted into the
y Hospital, the first being on the 30th of August; Prof. Carpen-
wever, is silent concerning the occurrence of the fever this year.
act explains why the legislature in the following winter repealed the
tine.

Season of 1819.—This year the fever was highly epidemic and
ant. According to Prof. Carpenter,* quoting the New Orleans
e, several vessels arrived from Havana, with cases of yellow fever, in
and about the 1st of July cases occurred on the ships lying in port.
overnor, in virtue of a discretionary power, then proclaimed a quaran-
ut it was not enforced. As I ascertained by the books of the Charity
tal, 141 cases were admitted into that establishment, the first being on
h of May; but up to the 28th of July, only twelve patients had been
ed. The Committee of the Société Médicale (p. 7), already quoted,
he same date for the first case; adding, that it proved fatal, and that
ver continued to occur sporadically till the 1st of August, when it
e epidemic; and did not cease till December.

. Season of 1820.—The admissions into the Charity Hospital this
ere 122; the first being on the 21st of July; but it was the 11th of
t before twelve cases were admitted. Prof. Carpenter† assigns the
f July as the commencement of the fever, which, he says, did not
e epidemic till near the middle of August. On the 17th of June,
ing to the same writer, a vessel arrived from Havana, having lost two
rom the fever on her voyage. On the 10th of July another came into
from Matanzas, with cases of the fever on board. In the following Feb-
1821, the legislature re-enacted a code of quarantine regulations.

St. John. They left Pensacola on the 21st of August, as soon as the fever began to prevail in that town. Some of the passengers died on the voyage, and the others dispersed themselves over the city. The same author also informs us, on the authority of the health officer, that persons were permitted to escape from vessels lying at the quarantine ground, and come into the city. The first appearance of the fever, as late as the 1st of September, certainly favors the theory of importation from Pensacola; yet, in several other years, it did not appear till the last week of August.

XIV. Season of 1823.—As the fever prevailed this season with great mortality at Natchez, it is important to inquire if it also prevailed in New Orleans. On this point Dr. Monette, of Natchez, has published the following statement: "New Orleans, this summer, was not unusually sickly until the 1st of August, although some cases of yellow fever had previously occurred. About the middle of August cases multiplied rapidly, and that city *suffered severely for two months.*"* This was published in 1838. In 1842, the same gentleman says of the same fever, "Many cases occurred among the ships' crews, and others, about the wharves, as early as July, and it became epidemic about the first week of August." Apparently borrowing from the Natchez historian, Prof. Carpenter, without quoting any authority or being in New Orleans at the time, says, "Cases occurred first among the shipping in the harbour, in the month of July, and the disease became epidemic early in August."† But Dr. Thomas, who was in the city, declared to me that, positively, the fever was entirely absent that year, and in a careful examination of the books of the Charity Hospital, I could find but *two* cases reported, one on the 23d of August, the other on the 11th of September. It seems impossible that the fever should have been epidemic without affording more cases to the Hospital, seeing that its victims belong chiefly to the class of persons who, when ill, rely on that Hospital for relief. It is certainly desirable to the cause of truth that these discrepancies should be reconciled.

XV. Season of 1824.—The admissions into the Charity Hospital this year were 178, the first being on the 4th of August. Prof. Carpenter‡ informs us that it was introduced by the boats which towed up infected vessels from the Balize to the quarantine ground. Having occasion to inspect the books for this year, of the surveyor of the port, I found that in the month of June, beginning on the 9th, twelve vessels arrived from yellow fever ports of the Gulf, and in July five others, yet no case was sent to the Hospital till the 4th of August, and only nineteen cases in that month, leaving 159 cases for the remainder of the season. It seems remarkable, on the theory of importation, that the arrivals in June and July should not have introduced the fever.

XVI. Season of 1825.—The admissions into the Hospital this year

* Essay on the Epidemic Yellow Fever of Natchez, p. 61. † Sketches, p. 25.

‡ Quoting "Documents in relation to the introduction of the Yellow Fever into New Orleans in 1824."

amounted only to ninety-two; and consequently it was scarcely epidemic. The first case occurred on the 23d of June. Prof. Carpenter recognises its existence, without offering any explanation; and Dr. Monette does not refer to it.

XVII. Season of 1826.—The number of cases sent to the Hospital this year amounted only to twenty-three; and consequently it was but sporadic. The first was on the 18th, the second on the 26th of May. Both Dr. Monette and Prof. Carpenter are silent concerning this sporadic prevalence.

XVIII. Season of 1827.—The first case was sent to the Charity Hospital on the 19th of July, and the books of that establishment report 388 cases; a larger number than had ever before been admitted in one season; yet Prof. Carpenter says nothing of its occurrence; and I have not been able to find any account of its origin.

XIX. Season of 1828.—The admissions this year were 305. The first patient was a sailor from Havana, admitted on the 18th of June. It was not till the 25th of July that twelve cases were admitted. Both Prof. Carpenter and Dr. Monette again are silent as to this epidemic. Concerning its origin, I have no information but that derived from the registers of the hospital.

XX. Season of 1829.—Prof. Carpenter recognises the Fever as being epidemic this season, but gives no information concerning its rise or progress. The Hospital register gives two cases in May, and twelve cases by the 17th of June. The whole number of admissions into the Hospital was 452. Dr. Monette* says it did not become epidemic till the 24th of August; but Dr. G. W. Campbell, of New Orleans, assured me, that it was epidemic four weeks before that time. According to that gentleman, it appeared in different parts of the city simultaneously; and public opinion was adverse to its having been imported. The first nine cases in the practice of Dr. Meux, occurred within four days of each other, in various parts of the city.

XXI. Season of 1830.—Prof. Carpenter says nothing of the Fever in New Orleans this year; but the books of the Charity Hospital record 416 cases, the first of which was on the 24th of July. Dr. Fenner† has stated the number at 256. I am unable to account for this discrepancy; except by supposing that he depended on returns given him by some inaccurate clerk of the Hospital. My own results were from personal counting on the registers; but if we adopt the lower number we still have indubitable evidence that the Fever was epidemic that year, notwithstanding the silence of Prof. Carpenter, who has perhaps accidentally transposed this year and the next.

XXII. Season of 1831.—The books of the Hospital report but three admissions, of which the first was on the 9th of June. Prof. Carpenter speaks of the Fever as being epidemic, perhaps meaning the last year.

XXIII. Season of 1832.—The number of admissions into the Hospital

* Essay, p. 74. † New Orleans Med. Journal, vol I. p. 103.

was 36; first case, August 15th. Prof. Carpenter is silent in reference to the Fever. The late Prof. Harrison has published that the Fever was epidemic;* and Dr. Halphen had previously done the same.† The first invasion of Epidemic Cholera was made this year—the first case occurring, according to Dr. Halphen, on the 2t5h of October. Many cases of yellow fever, I was assured by physicians of the city, were reported at the Hospital as cases of cholera.

XXIV. Season of 1833.—Prof. Carpenter indicates the Fever as epidemic. The number of admissions into the Hospital was 887, the first case being on the 12th of July. Prof. Harrison says it was violently epidemic. Dr. Campbell informed me that he saw a case on the 25th of June. According to Prof. Harrison there were occasional cases of cholera this season; and Dr. Barton observed the same thing.‡ According to that gentleman, menorrhagia and swellings of the inguinal ganglia in men, were frequent before the onset of the epidemic; there was also much sickness among horses, cows, and hogs, in the surrounding country. Dr. Barton, the historian of this epidemic, says nothing of importation, in which he is a disbeliever. Prof. Stone informed me that he was a resident physician of the Charity Hospital during this epidemic, and that nearly all the officers of the house were, like himself, unacclimated. The fever commenced near the river, and in the latter part of autumn prevailed among the inhabitants in the neighborhood of that establishment. It was crowded with yellow fever patients throughout the season, yet the officers, who did not go out into the city, remained exempt, till the people near the Hospital were invaded, when it fell upon the officers of the establishment.

XXV. Season of 1834.—Profesor Harrison marks this as an epidemic season, but Professor Carpenter says nothing of it. The number of admissions into the Hospital was only 150, but the record is imperfect. The first case was on the 28th of August. Cholera was sporadic.

XXVI. Season of 1835.—Professor Carpenter says nothing of the fever this year, but Professor Harrison represents it as a mild epidemic. Yet the number of cases in the Charity Hospital was 505, the first being on the 23d of August. According to the latter historian, sporadic cases of cholera still occurred.

XXVII. Season of 1836.—Prof. Carpenter does not speak of the fever this year. Prof. Harrison says there were a very few cases. The records of the Hospital show seven, of which the first was on the 24th of August.

XXVIII. Season of 1837.—A year of great prevalence, 1194 patients being admitted into the Hospital. The first admission was on the 24th of July. Prof. Harrison calls it a violent epidemic. Dr. Campbell informed me that he visited patients through nine miles along the left bank of the

* New Orleans Med. Jour. vol. ii. p. 131.

† Mem. sur le Chol. Morb. Compliqué d'une Epid. de Fièv. Jaune in 1832, par Michel Halphen, M.D.

‡ Account of the Epidemic Yellow Fever in 1833; Amer. Jour. of the Med. Sci. vol. xv. p. 30.

river. It was, however, the mildest epidemic he had known; but the deaths in the Charity Hospital were up to the average mortality. Prof. Carpenter* says the first cases occurred on board of vessels from the West Indies. It deserves to be recorded, that this is the first year since 1824 that Prof. Carpenter has assigned an origin for the fever, though between that year and the present, it was, as we have seen, epidemic nine times, but four of which, moreover, are mentioned by him. As he was a gentleman of extensive research, and believed in the importation of the fever, it may be presumed that facts going to establish its introduction during that period, could not be found.

XXIX. Season of 1838.—This year the fever was only sporadic. Twenty-four cases were received into the Charity Hospital—the first on the 25th of August. Prof. Harrison says there were a "few cases."

XXX. Season of 1839.—A year of violent prevalence. The number of admissions into the Hospital was 1086—the first on the 23d of July. Professor Carpenter† says—"Introduced from Havana." We are informed that the first cases occurred on board Havana vessels, and that the fever was during some time confined to the shipping. It was epidemic about the middle of August." An extended report was made on this epidemic by Drs. Bahier, Fortin, Daret, and Sabin Martin,‡ believers in the local origin of the fever, who do not refer to the fact mentioned by Prof. Carpenter, but declare, that we are profoundly ignorant of the cause of yellow fever.

XXXI. Season of 1840.—But two cases were admitted into the Hospital this year, and Prof. Harrison, has indicated it as a year of perfect exemption. The alternation of years of exemption and epidemic prevalence is more obvious in this period of the chronology of the fever, than any other. Thus it was epidemic in 1835—nearly absent in 1836; greatly epidemic in 1837—barely sporadic in 1838; strongly epidemic in 1839—almost unknown in 1840; violently epidemic, as we shall see, in 1841; moderately epidemic in 1842; and extensively epidemic in 1843.

XXXII. Season of 1841.—Admissions into the Hospital, 1113—first case, July 27th. Prof. Carpenter§ says—introduced from Havana. It is well remembered in the city, that the first cases were on board the ———, from the West Indies, and it prevailed some time among the shipping, before it became epidemic in the city. Prof. Harrison calls it a "violent epidemic," but says nothing of its origin. Dr. Jones assured me that this was a "searching epidemic," and that many persons who had passed through all seasons of fever untouched were attacked, and also, that it seized upon women more than it had done before. His first patient was a lady, who had kept at home for some time, lived three squares from the shipping, and was attacked before any one on board the ships. To this I may add from Dr. Thomas:‖

*Sketches, p. 26. †Sketches, p. 27. ‡ Jour. de la Soc. Med. No. 4.
§ Sketches, p. 29. ‖ Relat. de l'Epidémie de Fièvre Jaune, 1841, p. 7.

"It is an important remark, that, contrary to previous experience, the epidemic *at first* prevailed more among women than among men. For example, the first six patients whom I visited (between 30th August and 13th September), were all of the female sex; and I ascertained that the experience of my professional brethren was nearly the same. Now it is well known that ordinarily the case is just the reverse. Why this change? I do not know; as I saw no plausible reason, in 1841, which did not exist during the preceding epidemics.

"By a sort of compensation the malady was habitually less severe on females. Later in the epidemic the proportion of male patients increased; so that this anomaly existed only in the beginning."

XXXIII. SEASON OF 1842.—The Hospital books give 410 for this year, the first case being on the 30th of July.. Professor Carpenter* informs us that the first case occurred among the shipping from the West Indies and Mexico, and it continued to prevail among the shipping for some time before it spread through the city.

XXXIV. SEASON OF 1843.—According to Prof. Harrison, this epidemic was not of the most extensive or violent kind; yet 1053 were admitted into the Hospital—the first on the fifth of July. Prof. Carpenter states that "all the first cases that occurred, were persons who had arrived in vessels from Havana, Vera Cruz, &c. Those who saw the first cases were satisfied that its source was foreign. It became epidemic early in September." Dr. Meux informed me that as early as the 31st of July, when but twenty patients had been sent to the Charity Hospital, he had a case near the Water-works, in a woman who seldom went abroad.

XXXV. SEASON OF 1844.—The fever this year was moderately epidemic. The cases taken to the Charity Hospital numbered 150, of which eighty-three proved fatal. The whole number of deaths in the city was 148.†

XXXVI. SEASON OF 1845.—Nearly if not altogether exempt. The books of the Charity Hospital present but one case of (so called) yellow fever. It proved fatal; and the general bill for mortality of the city gives but a single death from that disease.‡ Yet I was assured by Dr. Mercier that a few cases did occur in the practice of several physicians.

XXXVII. SEASON OF 1846.—Extensively sporadic, or lightly epidemic, cases appearing in various parts of the city, and not traceable to any central focus.§ Admissions into the Charity Hospital, after the 1st of September, 148, and 89 deaths.

XXXVIII. SEASON OF 1847.—The visitation of this year was one of the severest which the city had ever experienced. The aggregate number of deaths, as reported from the cemeteries, was 2306; but this number was supposed not to include the whole. In September alone the number was 1044. The greatest number for a single week, that ending September 5th,

* Sketches, p. 29. Ibid. p. 30.
† New Orleans Med. Jour. vol. i. No. 4.
‡ Ibid. No. 5.
§ Ibid., vol. iii. No. 3.

was 435. The first ten cases admitted into the Charity Hospital were from the 5th to the 17th of July. They occurred in various parts of the city. On the 2d of August, the Board of Health declared the fever epidemic. On the 18th of October, it had lost that character, and the Board pronounced it safe for those who had fled from the city to return. The weather, however, was still warm, and continued so till in November. Great numbers of troops returned, sick, from Vera Cruz during the summer and early autumn. Very few of them, however, had yellow fever. Many of those who had, were received into the Luzenburg private hospital, but did not communicate the fever to its inmates. As in 1837, the fever extended up and down the river from Carrollton to the United States Barracks (see Pl. V.). Although the number of deaths was great (amounting, it was believed, to 3000, including those in the Fauxbourg Lafayette), the proportional mortality was not high, for the number of cases was immense. The following table presents the ages of 2460 of the victims:—

Under 1 year, ...	3	From 50 to 60 years, . .	103
From 1 to 10 years, . .	81	" 60 to 70 " . . .	46
" 10 to 20 " . . .	186	" 70 to 80 " . . .	14
" 20 to 30 " . . .	1098	" 80 to 90 " . . .	3
" 30 to 40 " . . .	671	" 90 to 100 " . . .	2
" 40 to 50 " . . .	250		

Many of the children were natives of the city. A large number of persons who had experienced previous attacks were now taken down a second time. Many who had resided fifteen or twenty years in the city without suffering, were now attacked for the first time, and not a few new-comers escaped.*

XXXIX. Season of 1848.—Barely epidemic. 1234 cases admitted into the Hospital: deaths, 420. This mortality was unusually low.†

CHAPTER III.

LOCAL HISTORY—PLACES EAST AND SOUTHEAST OF THE DELTA OF THE MISSISSIPPI.

SECTION I.

THE BALIZE.

I. The position of the Balize may be seen on Pl. V., and its topography in Vol. I. Bk. I. Pt. I. Ch. V. Sect. II. Although the greater number of ships from New Orleans leave the Mississippi through the Southwest Pass, the

* See Dr. Penner's excellent history of this epidemic, New Orleans Med. Journal, vol. v. No. 2.
† Ibid. vol. v. No. 5.

larger number enter it by the Southeast Pass, on which the Balize Village is situated. Two or three pilot-boats are generally kept cruising off the mouth of the Pass, and when a ship heaves in sight, a pilot is put on board. When it approaches the bar it comes to anchor, and is taken in tow by a steamer, in doing which there is of necessity more or less communication with it. Having been dragged over the bar, if from a port out of the United States, it is again brought to anchor, till its papers are examined by the boarding-officer, after which it is allowed to proceed. In some instances no steamer is present to tow it up to New Orleans, and in others a bargain is not immediately made, and thus vessels are detained in the mouth of the river, near the residences of the pilots. In all cases, when the tow-boats come down from New Orleans while the fever is prevailing in that city, there is intercourse between them and the pilots. Finally, there is a steam packet-boat which plies regularly between the two places. Hence the pilots, their families, and operatives, are not more exposed to all that can be developed from the soil of their peculiar locality, than they are to whatever belongs to ships from the ports of the Gulf and the tow-boats from New Orleans, while in latitude, the village is nearly a degree south of that city.

II. Of the Fever.—Under such circumstances, whatever may be the origin of the disease, we should *à priori* expect to find it a great scourge of this little population, and yet it appears to be a rare visitor, and is not regarded with the least concern. In my numerous inquiries, through a sojourn of ten days, I met with no one who spoke of it as having been epidemic; while every one favorably contrasted the Balize with New Orleans in reference to the fever. Some of those with whom I conversed, as Capt. Taylor, the boarding-officer of the port, had resided there many years, and others who visit the place every week, as Capt. Annable, master of the tow-boat Phœnix, assured me that the yellow fever here was nothing compared with what it is in the city. But there is professional testimony to the same point. The physician of the Balize, Dr. Van Antwerp, arrived at that place in the month of October, 1839. In that autumn, as we have seen, the fever was more extensively prevalent in New Orleans, than it had ever been before, and continued so late, that sixty-two patients were received into the Charity Hospital in the month of November; in 1841, 1113 patients were taken to the Hospital, and in 1842, 410; yet, up to the time of my interview with him in February, 1843, he had seen but four cases of yellow fever, and they occurred in different years. Two of them, as far as he could find out, originated in the place; a third was in an oysterman, who gathered oysters on the coast north of the Balize, and said he had not visited the city; the fourth was in a young man who had made a voyage to New Orleans when the fever was prevailing there.

As a negative proof of the exemption of this place, I may state that Prof. Carpenter does not mention it, although he wrote to prove the transmissi-

bility of the fever, and would certainly not have omitted to note its epidemic prevalence at a place so exposed to the influence of ships.

As this is the spot where ships from Havana and Vera Cruz, and towboats from New Orleans meet, there may be many cases of yellow fever contracted elsewhere, developed here, which must not be confounded with those which occur in the resident population of the Balize.

SECTION II.

MILITARY POSTS.

I. Forts St. Philip and Jackson.—The situation of these forts may be seen in Pl. V. They have been notorious for autumnal fever, but I have not met with any evidence of a single invasion of yellow fever.

II. Fort Wood.—The plate just mentioned will show the position of this post, which always maintained an unabated intercourse with New Orleans. Notwithstanding this, it has never been invaded by yellow fever. The Army returns, down to 1838,* show the fact, and Dr. Dalton, formerly Assistant Army Surgeon, but now of that city, informed me, that in 1829, when the fever was epidemic in the city, intercourse with the fort was not suspended, yet no case occurred at the post. It deserves to be mentioned, however, that in the autumn of that year the troops were temporarily transferred to Shieldsborough, where the fever broke out among them. It can of course never be known whether that would have happened if they had remained at Fort Wood.

III. Fort Pike.—A reference to Pl. V. will show the position of this post. Dr. Dalton was stationed in it for three years, during which there was no yellow fever, although the intercourse with New Orleans was unabated; and the Army Register tells us, that from the establishment of the post, in 1811, down to 1838, the fever had not occurred there.†

SECTION III.

CIVIL STATIONS BETWEEN NEW ORLEANS AND MOBILE.

I. Bay of St. Louis.—This is one of the places to which the unacclimated inhabitants of New Orleans escape when the fever begins to prevail in that city: still, it has not been without its visitations; but whether the disease was confined to those who had been acted on by the remote cause before they started, is not quite clear.

1. Season of 1820.—Dr. Merrill‡ states, that a detachment of troops had descended the Mississippi River, and were detained in New Orleans till

* Statistical Report of Sickness and Mortality, U. S. Army. † Ibid. p. 207, 274.
‡ Army Register, p. 20.

after the fever, which began that year on the 21st of July, had become prevalent. On the 20th of August, they arrived at Shieldsborough, west side of the Bay of St. Louis, and twelve hours after landing a soldier, who had been attacked on the voyage, died with black vomit. Within twenty-four hours afterward, five more were attacked with the same symptoms, of whom two died on the third day. It soon became general among them. Dr. Merrill does not say in his official report whether the disease attacked any others than the soldiery; but in conversation with him at Natchez, in 1844, he informed me, that the French and Spanish inhabitants of the place remained unaffected. There were strangers there, however, and among the rest several families from Natchez, who passed through New Orleans on their way thither, and they suffered. Dr. Bell,* in speaking of yellow fever at that place, apparently in the same year, says, it prevailed "with such dreadful malignity as to prove fatal after a few days' illness, to several natives of the place." The cantonment of the troops was two and a half miles southwest of the village of Shieldsborough.

The late Judge Butler, of the neighborhood of St. Francisville, gave me the following account of this epidemic.

On the 29th of July, 1819, there was a violent hurricane, which rolled up the waters of Lake Borgne upon the land, and spread over it an immense quantity of sea-weed. The village at Pass Christian, four miles from Shieldsborough, across the bay, was nearly destroyed by it, and many of the inhabitants sought an asylum in Shieldsborough. The yellow fever prevailed that year in New Orleans, and as usual a number of persons fled to Shieldsborough, where they were taken down with the disease, but it did not extend to others. The next year, 1820, the coasts around the bay were foul, from the *exuviæ* thrown upon them, by the hurricane the year before, and the fever prevailed violently among the *resident* inhabitants. Dr. Merrill, however, says that in his investigation of the remote cause of the fever that season, he found the sea-weed perfectly dry and emitting no smell whatever. The drought was, in fact, very great that summer and autumn.

It appears, then, on the whole, that persons who had not been in New Orleans were affected; but, whether from a cause originating on the shores of the bay, or whether the disease was introduced from the city, remains undecided.

2. SEASON OF 1829.—This is the next year in which I have found any account of yellow fever at this place. As already mentioned, the troops usually stationed at Fort Wood, were this summer transferred to Shieldsborough, where the fever, which was at the time epidemic in New Orleans, soon appeared among them.

According to Surgeon Lining, it commenced on the 5th of August, and by the end of the month, all the officers and men present—with the exception of four privates—were attacked.† Dr. Dalton, who was stationed at

* Army Register, p. 20.

† Stat. Rep. U. S. A., p. 278.

Fort Pike, was ordered to Shieldsborough to assist Dr. Lining. He has informed me that a few of the inhabitants and visitors had the fever. Removing to Fort Pike he was seized with it, but no other case occurred at that post.

3. Season of 1839.—According to Dr. Monette,* a number of those who had fled from New Orleans were taken down with the fever, but it did not extend to the resident population.

II. Bay of Biloxi.—It has been already stated that the first French settlement on the coast of the Gulf of Mexico, was at this bay. Three years after it was made, that is, in 1702, it was assailed by what was regarded as yellow fever.† This was the first occurrence of that disease north of Havana. The settlement did not flourish, and we hear no more of the fever at this place till it is mentioned as occurring among, or introduced by those who left New Orleans to escape from it. From its position it has daily intercourse with both that city and Mobile; yet both Prof. Carpenter and Dr. Monette (believers in transmission) are limited to a single invasion, that of 1839; a season in which a larger number of places were affected than in any other, as may be seen by the general table. Down to that year, as Dr. Monette was informed by G. L. C. Davis, Esq., of New Orleans, refugees from the city were often attacked with the fever at Biloxi, but the resident inhabitants escaped. But in 1839, after seven persons had sickened in Belman's Hotel, near the steamboat landing, several citizens of the place contracted the disease.‡ It is to be regretted that we are not told, whether the seven were refugees from New Orleans or Mobile; and also, whether those who are said to have suffered from visiting the hotel had or had not been in one of those cities, after the fever began to prevail.

III. Pascagoula Bay.—Like the other bays just mentioned, this has been one of the places of retreat for the people of New Orleans and Mobile, especially the latter, during epidemic invasions of yellow fever; but neither Dr. Monette, Prof. Carpenter, nor any other historian, has mentioned its occurring there. I have been assured, however, by Dr. Fearn, of Mobile, that in 1839, when Biloxi was affected, the settlements around Pascagoula Bay likewise suffered. He was there, and assured himself that inhabitants of the place, who had not during the summer visited any place where the fever was prevailing, were affected with it.

IV. Observations of a Gulf Commander.—This seems to be a proper place to introduce the observations of the commander of one of the steampackets on which I sailed between New Orleans and Mobile. Capt. Hutchins, had been an intelligent and observing navigator of the Gulf for fifteen years. Yellow fever in his opinion is essentially a city disease. He is not prepared to believe it contagious. In 1839, when it prevailed violently in the two cities just mentioned, he was piloting a steamboat running between

* Observations, p. 117.

† Bancroft's Hist. Col. U. S., vol. iii. ch. xxi. Lewis, in New Orleans Jour., vol. i. No. 4.

‡ Observations, p. 117.

them. When the boat reached Milneburg, the terminus of the New Orleans and Lake Pontchartrain Railroad, he and the clerk of the boat were accustomed to visit the city, and at length both were seized with the fever; but the other officers and sailors remained healthy.

SECTION IV.

BAY AND CITY OF MOBILE.

I. SEASON OF 1705.—For the topography of this locality the reader is referred to Plate V. Sect. VIII. Ch. III. Pt. I. Bk. I. Two or three years after the settlement of Mobile, then called Fort Louis, it suffered, as Dr. Lewis* believes, from yellow fever. He refers to Bancroft's History of the Colonization of the United States; but I have not been able to find any mention of it by that historian. If, however, it prevailed at Biloxi in 1702, it may be presumed to have occurred in Mobile in 1705.

II. SEASON OF 1765.—We read no more of the fever for sixty years, when its historian is Romans,† who informs us that the fever prevailed in that year as a severe epidemic. After mentioning the dissipated habits of the people, their drinking stagnant water, and the position of the town opposite the marshes of the bay, he adds, "In the year 1765, a regiment of [British] troops arrived from Jamaica, and brought with them a contagious distemper." In a subsequent part of his book, page 232, he indicates that this distemper was the fever we are now considering. "I am persuaded," says he, "that whenever the yellow fever has made its appearance in the Floridas [which at that time included Mobile], it was imported from Jamaica or Havana, as was the case in 1765, which, by the way, was almost universally an unhealthy era, as well in Europe as elsewhere." The population of Mobile at this time consisted only of a few hundred French and Spaniards.

III. SEASONS FROM 1765 TO 1819.—I can find no evidence of the occurrence of the fever through a period of fifty-three years from the first of these dates; though during that period it was epidemic in New Orleans seven times.

Mr. Krebs, a veritable creole, who was in Mobile in the year 1811, says, that a man attached to a vessel from Pensacola, where it prevailed, was seized with it in Mobile, and died; but no other person had the disease. Judge Chamberlain, who arrived in 1813, informed me, that the public opinion then was that Mobile was exempt from the fever. The people of New Orleans were accustomed to escape from that city, to this, when the disease prevailed there. When Judge C. arrived, the population of Mobile did not exceed 500,—chiefly French, a few Spaniards and Anglo-Americans.

* New Orleans Med. Jour. vol. i. No. 4.

† A Concise History of East and West Florida, by Capt. Bernard Romans, Phila. 1776, p. 13.

The place had no foreign commerce, and but two or three schooners plied between it and New Orleans. From the year of his arrival (1813) to 1819, no yellow fever occurred. Dr. Levert, who settled in this city about the year 1830, informs me, that the most careful inquiry had not enabled him to find any account of the prevalence of the fever from 1765 to 1819. Between these two dates there was a considerable immigration of Americans, who began to build wharves, and the number of vessels coming into port multiplied. In the years 1818 and 1819, there was much immigration.

IV. Season of 1819.—Judge Chamberlain remembers that the month of July, and the early part of August, were remarkable for the quantity of rain. It fell almost daily, for nearly forty days, with occasional strong winds, approaching to hurricanes, and producing high tides, which threw up drift-wood and filth on the quay, not then raised to its present height, while the water passed under a great many houses.

Early in August, a small vessel arrived from the West Indies and came up to the wharf. Two days afterwards a young man of Mobile, who had come as a passenger, left her, sickened with yellow fever, and died at the corner of Water and Dauphin Streets. Another died on board the vessel about the same time. These were the first cases, Mr. Krebs confirming the statement of Judge Chamberlain. The fever soon spread over the village, which was chiefly east of Dauphin Street. The population at this time was 12 or 1300, about one-third of whom were French and Spaniards. They suffered much less than the Americans and Irish. According to Dr. Lewis, about 300 of the inhabitants fled on the appearance of the fever. The mortality was very great. The type of the disease was the worst he ever saw. Persons were often found dead in the streets in the morning. It continued till severe frosts occurred in November. Many persons who escaped to the country returned too early and were attacked. As well as he recollects, the summers between 1813 and 1819 were not like that of the latter year. To this circumstantial account I may add from Dr. Lewis,* that from the best accounts he has been able to procure, the filling up of that portion of the town which now composes the commercial part of the city, was commenced early in the spring of 1819, and the materials were sand and *marsh mud*, abounding in vegetable matter. As that margin of the city was itself a marsh, long wooden wharves were projected over it to the deeper water. The houses were built on wooden pens to raise them above the high tides. The rains began on the 24th of June; and a great hurricane, mentioned by Judge Chamberlain, occurred on the 29th of July, inundating all the lower part of the town, and depositing vast quantities of sea-weed and other exuviæ upon it. The months of April, May, and June, had been unusually warm. The hurricane was followed by cool nights. Thus far the recollections of Judge Chamberlain; and the combined recollections of that

* New Orleans Med. Jour. vol. i. p. 284.

gentleman and other old citizens, as given by Dr. Lewis, corroborate each other, but what follows in relation to the advent of the fever differs from the reminiscences of the Judge and Mr. Krebs.

"Intermittent and remittent fever, in a very mild form, began to prevail early in May. In June, there were several deaths of bilious fever; they increased in number and severity during the month of July; and by the 6th of August, there were some thirty deaths of this disease. I have the authority of several gentlemen, among them our late esteemed mayor, Mr. Hall, for stating that *one case* of black vomit occurred in the latter part of May. In relation to the number of cases which occurred in June, there are various estimates; I am not satisfied that more than two or three occurred. In July, there were some few sporadic cases, as they were called, probably six or eight; and all agree that in the first week of August, the yellow fever became predominant among the whites. The first victims were some mechanics, seven in number, who had lately arrived, and resided in a wooden tavern on Dauphin Street. They were attacked about the same time, and died within a few hours of each other, all having black vomit. From this time until winter, the scene was truly lamentable. So concentrated was the poison, and so great its facility in adapting its deadly effects to different constitutions, that no one could escape. The mulatto, the black, the Indian, and the white, the native and stranger, were alike its victims.

"It was attempted by the violent partisan contagionists of New York, through agents here, to induce the impression that the disease was of foreign origin. When this became a question, the citizens held a meeting, and appointed a committee of seven of the most intelligent of their body, to report upon the causes of the disease. This committee *unanimously* reported in favor of its domestic origin, and referred to the causes which I have briefly alluded to, as the agents of its production. Several small water-craft arrived here during the summer. The one which it was *ingeniously supposed* brought the infection, came into port about the middle of July, from Havana. The citizens were, however, not only sensible of unusual sickness, but knew there were cases of black vomit, before the arrival of the suspected vessel. They made this report in accordance with these facts.

"The whole number of deaths was 430. This mortality, in a population not exceeding one thousand, and more than one-half of them exempt, under ordinary circumstances, from either bilious or yellow fever, is probably without a parallel on this side of the Atlantic. From a mutilated list of interments for September, I get the names of eighty who died. Twelve of these are slaves, twenty-five *free colored or quadroons*, and forty-three of the names are those common to Americans, English, and Irish. By the 1st of October such of the whites as remained alive, fled the city; in that month, the deaths were mostly from the mixed Creoles of the place. I believe, from all the information I can obtain, the deaths were equally divided among the two classes of people."

Neither Dr. Monette nor Prof. Carpenter refers to this epidemic. It is worthy of remark that a case of black vomit is said to have occurred in each city in the month of May; after which there were scattering cases in both cities, till the first week of August, when the fever became epidemic in both.

V. SEASONS OF 1820 TO 1824.—The year 1820 seems to have been exempt; while the number of admissions into the Charity Hospital at New Orleans was 122, within nineteen of what it was the preceding year; but in 1821, when New Orleans had none, seven cases occurred in Mobile in the month of October!* Dr. Levert and Dr. M'Nelly have told me that from inquiry they have satisfied themselves that the fever really did occur sporadically that year. In 1822, there were only four or five cases, though† it was epidemic in New Orleans. Judge Chamberlain recollects that there were a few. In 1823, there seems to have been none, and none or next to none in New Orleans, while it was fatally epidemic at Natchez, 300 miles in the interior. In 1824, six fatal cases in the month of September.‡

VI. SEASON OF 1825.—After a five years' exemption from an epidemic, the city was this year reinvaded. Judge Chamberlain says it commenced down Water Street, in September, and lasted only about thirty days, being succeeded by bilious fever; was less malignant than in 1819. Heard no allegation of its being imported; recollects no arrival of a vessel said to have yellow fever on board; the commerce of the city had increased rapidly; remembers nothing peculiar in the season. Dr. Lewis§ says it was preceded, in August, by what the Board of Health calls bilious fever, in many instances stated. September 2d, a case of yellow fever reported; 5th, three cases; 8th, four cases; 11th, epidemic. No mention of the arrival of ships having the disease among their crews. Deaths of the autumn 120, many of which were from what was called bilious fever. Drs. Levert, M'Nelly, and Lopez, from subsequent inquiry, informed me that the disease was decidedly epidemic; in New Orleans it was only sporadic.

VII. SEASONS OF 1826, '7, AND '8.—The gentlemen just named have from inquiry come to the conclusion that while the first and the last of these years were exempt, the autumn of 1827 experienced a considerable visitation, and Judge Chamberlain states the same thing. It commenced in August, down Water Street, where ships were repaired. Was at first fatal, but soon became manageable, and did not continue long. Many of the unacclimated had now adopted the practice of spending the summer and autumn in the country. The gentlemen just quoted says that Mrs. Warren died of yellow fever at Springfield this year, without having been in the city. He thinks that country cases have generally been contracted in town. Knows of no instance of its propagation in the country. There was a hurricane about the end of June, which drove the vessels up to Water Street. Dr. Lewis says that during these three years, the population had

* Lewis, p. 284. † Ibid. ‡ Ibid., p. 287. § Ibid., p. 288.

increased by immigrants from the northern part of the United States and from Ireland. The fever was epidemic this year in New Orleans. Prof. Carpenter makes no mention of either visitation.

VIII. Season of 1829.—The disease, according to the facts collected by Drs. Levert, Lopez, and M'Nelly, was epidemic this autumn. Dr. Lewis informs us that the deaths from bilious and yellow fever amounted to about 130. The first case of the latter was published by the Board of Health on the 14th of September, and on the 22d it was pronounced epidemic. This year it was epidemic in New Orleans, beginning in May, and continuing to occur in June. This epidemic was not mentioned by Dr. C.

IX. Seasons of 1830, '31, '32, '33, '34, '35, and '36.—According to the recollections of Judge Chamberlain, and the testimony of the physicians of the city generally, many of whom arrived there within the years just enumerated, they were free from the fever. Two summers were attended with great rains, storms, and other atmospheric phenomena, which raised in the minds of many persons anticipations of the fever; but it did not appear. During this period it was three times epidemic in New Orleans; once extensively sporadic, twice moderately so, &c., and once only three cases were sent to the Charity Hospital. In these years the population of the city nearly trebled, and its commerce increased in a still higher ratio.* Judge Chamberlain informed me that the ground south of Royal Street and the river was raised by filling up; and the streets were graded and covered with sea-shells this summer.

X. Season of 1837.—We come to a period when most of the present physicians of Mobile were in the city, and consequently more can be known of this and the subsequent invasions, than of the earlier. Dr. Lewis† informs us, that the number of deaths from yellow fever was 350, consequently this was a fatal epidemic. I have no reliable account of the weather which preceded this invasion. Judge Chamberlain thinks the summer was unusually hot. Dr. Nott says the weather had been dry, and that a northerly wind preceded the outbreak. The usual visitation of autumnal fever began with the warm weather and increased with its progress. Dr. Nott informed me that on the 20th of September, four cases of the fever occurred on the same day. One at the corner of Royal and St. Francis Streets, two in St. Francis near Clabourne Street, and one in Ann Street near the forks of the road to Spring Hill. There was none in the ships, lying either at the wharf or in the harbor near the mouth of the bay. No other cases occurred for three weeks, when it broke out all over the city, affecting great numbers. Immediately before this second invasion, there was a southern storm, which threw the waters of the bay over the island marshes in front of the city, and upon the quay, even to the houses on Front Street. Dr. Lewis‡ confirms the statement, that on the 20th of September, four cases occurred about the middle of the city. On the 2d

* Lewis, p. 287. † Ibid. ‡ Ibid.

of October, he adds, the wind changed, and a very tight frost appeared, when many of the absentees returned to the city, and on the 10th, "the fever made its appearance in every section of the town;" and continued to prevail till the middle of November. Dr. Huestis recorded at the time, that it was much more fatal to those who had *recently* immigrated from the North than to those who had come from the same region four or five years before, although no yellow fever had occurred within that period. This year more persons perished from the fever in New Orleans than had ever died before in one autumn. It began on the 24th of July, eight weeks before its first appearance in Mobile, and nearly eleven weeks before its second or epidemic outbreak. Neither Dr. Monette nor Prof. Carpenter refers to this invasion.

The following year, 1838, was nearly exempt from the disease; Drs. Levert and M'Nelly saw a few cases; a great number of Irish and German laborers arrived in the city this year.

XI. Season of 1839.—Greatly epidemic. Judge Chamberlain does not recollect any peculiarity of the season. Dr. Nott says the wind was southerly, with four or five showers a week, for six weeks before the disease set in, but such weather is not uncommon in summer. For several days before the first case occurred the weather was dry, with northerly wind, an atmospheric condition which continued with but little variation for nearly a month. The first case, says Dr. Lewis,* occurred on the 11th of August, and in ten days it became general throughout the entire city. So predominant was its influence that no other disease was to be seen, but many cases were mild. Dr. Lewis does not mention the locality of the first patients, but Dr. Nott says it was at the corner of Government and Hamilton Streets; and that the fever spread from that point, as from a focus; affecting not only the whole city, but its environs and the country, to the distance of two or three miles from the bay. This account of its spread among the people in the neighborhood of the city was verified by Dr. Fearn and Dr. Levert. The watermen of the lighters of the bay, Dr. Nott says, were affected, but not till after it had appeared in the city. He does not know whether it prevailed in the shipping at Mobile Point, and Dr. Lewis is silent on that subject. Everybody assured me, that there was no allegation that it was imported.

It should be borne in mind that this was the epidemic which prevailed over a greater geographical extent than any other which has ever visited the basin of the Mississippi. The first case sent to the Charity Hospital in New Orleans was on the 23d of July. Its greatest prevalence in that city was in August, which seems to have been the case in Mobile.

Dr. Levert, who escaped the fever in 1837, had it this year. Indeed, all the physicians of the city except two were ill. The Doctor saw three or four second attacks in persons who had not been away from the place. Saw one patient in a third attack. Saw a second attack seven weeks after

* Lewis, p. 289.

the first. Many immigrants who escaped the fever in 1837 were now affected. The mortality was chiefly among the poorer immigrants, many of whom died without medical aid, while the physicians of the city were sick.

On the 7th of October, when, as I am informed by Dr. Gates, the epidemic had greatly abated, a fire broke out, and in a few hours consumed twelve squares. It was not followed by any revival of the fever; which, however, continued to affect individuals returning to the city till December. Dr. Crawford saw a young man with the disease long after white frost had occurred, who had just come to the city for the first time. Late in this month a man came to the city, and lodged in a house where several persons had died; he contracted the disease. However, according to Dr. Nott, in about six weeks from the 11th of August, it had begun to abate, and was almost entirely arrested by some severe frosts which occurred near the end of October.

XII. SEASONS OF 1840, '41, AND '42.—A. D. 1840. This year was unusually free from all kinds of disease. No yellow fever occurred. New Orleans was equally, or almost equally, exempt, as but two cases were sent to the Charity Hospital.

A. D. 1841. The salubrity of this year was almost equal to the last, but there were, according to Dr. Lewis,* and Drs. Levert, M'Nelly, and Lopez, a few cases of yellow fever in persons from the country. In New Orleans, however, it prevailed to such an extent, that a greater number of patients were sent to the Charity Hospital in September, than were ever before taken there in a single month.

A. D. 1842. This year the fever was mildly epidemic. The number of cases, according to Dr. Lewis, did not exceed 160, and 70 deaths. In a joint conversation with Drs. Fearn, Levert, Crawford, Ross, Lopez, Nott, and M'Nelly, the following account of the first cases of this epidemic was made out. First case, about the 18th or 20th of August, at the corner of Government and Hamilton Streets. Second, corner of Maiden Lane and Water Street, fatal. Third, fifty yards from the second, on the 29th of August, fatal. Fourth, on the same day, corner of Spanish Alley and Church Street, in the midst of dirt and filth. Fifth, in Dauphin Street, between Laurence and Hamilton, fatal. Sixth, on Franklin Street between Government and Conti, fatal. Subsequently, for three or four weeks, cases continued to occur, chiefly south of Dauphin Street, and off to the west. Afterwards it crossed Dauphin Street, but finally, the cases south of that street, were eight or ten times more numerous than north of it. Dr. Lewis says that it was confined to the southern section of the city. No case *originated* north of Dauphin Street, which runs east and west, dividing the city into two equal halves. There were cases at the Pavilion, three miles down the bay, but all the patients had been in the city.

* Lewis, p. 289.

There was no suggestion of importation. The disease was moderately epidemic in New Orleans this year. Prof. Carpenter has not referred to its occurrence in Mobile.

XIII. Season of 1843.—The epidemic visitation of this year was violent and fatal, but fell chiefly on that part of the city north of Dauphin Street, which had escaped the year before. When it commenced, the autumnal fever had been rife for several weeks. By collating the accounts of the highly respectable body of physicians named in the preceding article, I am enabled to state, on the authority of Dr. Crawford, that the first unequivocal cases were on the 18th of August,* one of which proved fatal. The case of recovery was on Conception Street, between Conti and Dauphin, the other at the corner of St. Anthony and Hamilton Streets. On the 24th, a case, which ended favorably, on the corner of Church and Water Streets; and another (Dr. Lewis, p. 290), which proved mortal. On the 26th, according to the same authority, another, fatal. The localities of these two not given. On the 3d of September, Dr. Fearn had a case, near the corner of Dauphin and Royal Streets, restored. These were nearly all the well-marked cases that occurred, till after the end of the first week of September. On the 10th and 12th, Dr. M'Nelly had three cases near the corner of Hamilton and St. Anthony Streets; on the 12th, Dr. Levert had one at the same intersection; on the 13th, Dr. Fearn had one on the corner of Francis and Cedar Streets; on the 14th, Dr. Levert had one on the corner of Royal and Conti Streets. Between the 13th and 19th, Dr. Crawford had, or saw, four cases in one house near the corner of Hamilton and St. Louis Streets, three of which proved fatal. These patients had just returned from a trip of pleasure and dissipation to the opposite side of Mobile Bay, here twelve miles wide, where they spent two or three days and nights. On the voyage they were becalmed, and for some time exposed to the burning sun. About five others were of the same party, of whom four died with the fever not long afterwards. In the same neighborhood, at about the same date, Dr. Crawford had five cases in one family and nine in another. On the 15th, 16th, 17th, and 21st, Dr. Fearn had cases at the corner of Commerce and St. Anthony, of Franklin and Monro, in Royal, between Conti and Dauphin, and at the corner of Joachim and Dauphin Streets; on the 16th and 18th, Dr. Levert had three cases—one, corner of Dauphin and Hamilton—one on St. Louis below Franklin, and one on the corner of St. Michael and Jaques Street. After the 20th, the fever began to assume an epidemic character (Levert), and by the 6th of October, it had, according to Dr. Lewis, extended to all parts of the city. The reader will observe in this narrative a perpetual recurrence to the same streets; and by turning to the map will at once see the part of the city in which the disease made its appearance, and where it prevailed for three weeks; after which, in the language of Dr. Lewis, it could be traced in a south-

* Dr. Lewis, p. 291, says the 24th. The discrepancy involves nothing of importance.

easterly direction until it reached the heart of the city. While it was here exerting its deadly influence, it appeared in a block of buildings some distance from the other localities, and westwardly from the bay. While the yellow fever thus prevailed, other parts of the city, in which it had not yet occurred, were infested with ordinary intermittents and remittents. The yellow fever was confined very much to the better class of citizens, for after 1839, the immigration of laborers had been nearly suspended, and negroes were more employed in the city than formerly. The epidemic continued till about the 5th of November. The number of cases was estimated at 750; the population of the city being at the time (including those who fled to the country), 14,000.*

Dr. Nott sent some citizens to Spring Hill, after the first cases occurred They remained exempt, but returning to the city in November were attacked. He knew several instances of persons sojourning there for the summer, who from spending a day in the city were attacked. In two instances it was a fortnight after the visit before the disease was developed. In no case did the disease spread from those who had contracted it in the city, nor is it known to have originated there. Of one large family three of the members visited the city, and all had the disease; eight or ten others remained out, and all escaped it. Two young men came in and spent only an hour each, yet both were attacked with the fever.

Dr. M'Nelly knew of a young man from the Atlantic States who spent two hours in the city, then passed on to Spring Hill, and in a few days after sickened of the fever and died. A patient of the same gentleman, the mother of a family, died of the fever; the survivors moved to a house low down on Water Street, where they were attacked, and two men who lived there also suffered attacks. As early as June, a young man retired from the city to Spring Hill; some time afterwards he returned on a visit. Twenty days after this he was seized with intermittent fever, which continued for a week, when he died with black vomit.

On the 8th of December, this year, Dr. Levert had three cases of the fever. The cold which merely produces white frost will not finally check the disease. The temperature of the ground need not fall below 40° for this effect to be produced. To terminate an epidemic, ice must form on the surface of the ground.—(Dr. Fearn.)

The outbreak of the fever this year was remote from the wharves and shipping, and no suspicion was entertained by anybody of its introduction from abroad. As to local causes, none could be assigned, unless a considerable extent of excavation on the streets of that part of the city should be regarded as such.

XIV. Season of 1844, '45, and '46.—Mildly epidemic† in the first, absent or slightly sporadic in the latter. I have seen no notice of the occurrence of the fever in the last year.

* Lewis, p. 291. † New Orleans Journal.

XV. Season of 1847.—Epidemic.
XVI. Season of 1848.—[MSS. wanting.—Ed.]
XVII. Season of 1849.—[MSS. wanting.—Ed.]

THE FEVER AT BLAKELY.

I have not given the topography of Blakely in Book I., for it is to be classed with the towns that were, rather than those which now exist. It was commenced in the year 1815,* and a rapid emigration for several years raised it into a rivalry with Mobile, from which it soon fell off, and the voyager now scarcely recognizes it as even an inconsiderable village. Its site is the margin of the high tertiary plain of red clay and sand, which constitutes the eastern bank of Mobile Bay, near the junction of the Tensaw Channel with the head of the Bay. Its distance is about twelve miles from Mobile, on the opposite side, and a little higher up the Bay. It had not an old Creole population, like Mobile; but was essentially a new and suddenly-developed American town, composed largely of adventurers from the higher latitudes of the Western and the Atlantic States.

It does not appear that the epidemic which visited Mobile, in 1819, affected Blakely; but in 1822, when the fever was but lightly sporadic in the city, it proved a violent epidemic in Blakely.† Of the circumstances of its origin there nothing I believe is now known. Soon after this date the immigration to Blakely ceased, and was succeeded by the removal of many of its inhabitants. Since that year it has not, as far as I can learn, experienced a visitation; although Mobile, as we have just seen, has been several times invaded.

SECTION V.

PENSACOLA BAY.

I. Under this head we may include the town of Pensacola, the Navy Yard, nine miles below, the Naval Hospital, a mile further down, and the three forts,—Barrancas, a mile below the Hospital, and Fort M'Cree and Fort Pickens, a mile lower and at the very entrance of the Bay. All these places and establishments are on the right or western side of the Bay, except Fort Pickens, which is on the end of St. Rosa Island.

II. The first settlement on Pensacola Bay was made by the Spaniards, in 1696, near the mouth of the Bay. In 1719, the French took possession of this and other settlements made near it. The Spaniards, however, retook it in less than two months; but the French regained it within a year, and kept possession of it till 1722, when it was restored to Spain. In 1754, the settlements were concentrated on the present site of Pensacola. In 1763 it was ceded to England, and in 1765 the town was laid off with regularity.

* Darby's Emigrant's Guide, p. 36. † Judge Chamberlain—Dr. Lewis.

In 1781, it was captured by the Spaniards, who thenceforward retained possession of it till Florida was ceded to the United States, in 1821. In this way, while the parent-stock of its population was Spanish, many French and English were engrafted upon it. After the cession to England, in 1763, many of the Spaniards left it for Cuba, and Englishmen supplied their places.

After the capture of 1781, nearly all the English left it; and Spaniards with a few French came in. After the cession to the United States, a large part of the Spanish population again departed for the Havana; and a much greater number of Americans, with a considerable portion of our army, supplied their places. The latter were garrisoned at Cantonment Clinch, two miles west of the town, on a pine plateau.

From the discovery of Pensacola Bay down to the present time, it has been the principal harbor of the ships of war which the nations possessing it have had cruising in the Gulf of Mexico; but the commerce of the town has never been considerable. Schooners have at all times, and especially since 1821, kept up a regular intercourse with New Orleans and Mobile; and, now and then an arrival from Havana, more rarely from Vera Cruz and other ports of the Gulf of Mexico and Caribbean Sea, has presented a trading vessel in the midst of the naval marine. Let us now proceed to inquire into the invasions of yellow fever, as experienced by the town, the naval and military establishments, and the shipping.

III. SEASON OF 1765.—I have met with no record or tradition of yellow fever on Pensacola Bay earlier than 1765, two years after it was ceded to the English. On the events of that year Lind has the following paragraph:—*

"At Pensacola, where the soil is sandy, and quite barren, the English have suffered much by sickness; some, for want of vegetables, died of scurvy; but a far greater part of fever. The excessive heat of the weather has sometimes produced in this place a severe fever, similar to that which in the West Indies goes under the name of yellow fever. This, in the year 1765, proved very fatal to a regiment of soldiers sent from England, unseasoned to such climates, from the unfortunate circumstance of their being landed there in the height of the sickly season. It raged chiefly in the fort, where the air in the soldiers' barracks, being sheltered from the sea-breeze by the walls of the fort, was extremely sultry and unhealthy. And it is worthy of remark that during the fatal rage of this fever at Pensacola, such as lived on board the ships in the harbor escaped it."

Bernard Romans,† a distinct authority, refers to the same epidemic. Thus we find that the first appearance of the fever was among newly-arrived immigrants from Europe. It is worthy of remark, that in 1781 and '82, when the English were expelled, and the Spaniards returned from Cuba and Spain, no yellow fever appeared.

* Essay on the Diseases incident to Europeans in Hot Climates. Am. Ed. p. 25.
† Concise History of East and West Florida. ‡ Jno. Innerarity, Esq.

IV. Season of 1811.—From 1765 to this date, a period of forty-seven years, no yellow fever appears to have occurred. The commerce of the place was small; but, being a Spanish town, we may presume most of its trade was with the Havana. In the summer of 1811, many long ditches were dug through the semicircular swamp which invests the town in its rear; and soon afterwards, there occurred a dry north wind, so cold as to render fires comfortable. The fever then broke out, and was fatal to nearly all the Anglo-American population; affecting in a milder way many of the Spaniards.* In this year, the fever was epidemic in New Orleans. Eleven years passed away without another invasion. The habits of the Spanish people were simple and temperate; they ate but little meat, refrained from ardent spirits, and drank weak wines.†

V. Season of 1822.—In 1821, General Jackson, with a considerable body of troops, was ordered to take possession of Pensacola, Florida having been purchased from Spain. At the same time, there was a rush of emigrants to that place from various parts of the United States. This influx began in July, and continued throughout the following autumn and winter. The houses were so crowded that many persons slept in the porches and verandahs all night,‡ but they continued healthy. No yellow fever appeared, either in the town, the camp, or the marine.

Before the ensuing summer, 1822, a considerable number had left the place, but it was still thronged with strangers. Meanwhile, the Spanish troops, and all the officers and agents of that government, with a portion of the Spanish people, had departed for Cuba.§ The new-comers indulged freely in meat and whiskey.‖ More ditching of the swamp was now performed.¶ The mean summer heat of that year at Camp Clinch, two miles in the country, was 82·71°, which is less than half a degree above the mean summer temperature of the post, as deduced from seven years' observations. The number of rainy days was forty-two, or six more than the summer mean of the same period.** Thus there was no remarkable deviation from the ordinary course of that season; yet Dr. Brosnaham and Mr. Innerarity recollect, that the summer was dry, and the springs around the town, which are supplied by the rains which fall on the adjacent sandy plain, were very much reduced in volume. It would seem, then, that the rains were not copious.

Although, as we have just seen, the mean heat of the summer was not above the standard temperature of Pensacola, that of June was greater than that of July by 2·29°, and above that of any other June during the seven years that observations were made at Camp Clinch; and although the summer, taken altogether, was not particularly wet, July was, having twenty rainy days,†† during which a storm from the southwest, of several days' duration, occurred.‡‡

* Jno. Innerarity, Esq. † Dr. Brosnaham. ‡ Mr. Areus.
§ Mr. Carro. ‖ Dr. Brosnaham. ¶ Mr. Innerarity.
** Army Meteorological Register. †† Ibid. ‡‡ Medical Stat. of the United States Army, p. 36.

According to Assistant-Surgeon M'Mahon,* the first five months of the year were remarkably healthy. In the sixth (June), the inhabitants complained of lassitude, impaired appetite, and a depression of spirits. Towards its close, and in July, a number of severe cases of fever occurred, but none of them put on the aspect of yellow fever. There was, also, a fatal epidemic, the character of which was not observed, among dogs, foxes, and panthers, and many of the two latter were found dead in the woods.

In the month of July, a vessel [the Alabama.—Ed.] laden with spoiled codfish, from the North, put into the port of Havana, where the smell of the fish was found to be so offensive, that the city police ordered her to sail to some other port, or to throw her cargo into the sea, outside of the bar. She chose the former, and departed for Pensacola, which place she reached within the same month. Coming up the bay to the town, she anchored at the end of the long wharf, where she lay for eight or ten days. She had no case of fever on board.

After landing a few hundred-weight of fish, the vessel, by order of the police, attempted to sail out of the bay, but grounded near its mouth, in front of Fort Barrancas. She there discharged her cargo upon the beach, where it laid for a fortnight, when it was sold at auction. The captain and mate, and some of the sailors engaged in this duty, fell sick with yellow fever, and died; but, according to Dr. Merrill,† the troops of Fort Barrancas about one hundred in number, although exposed daily, for a month, to the stench of this damaged cargo, lying near them on the beach, experienced no attack of yellow fever till three weeks after it was removed.

Several persons in Pensacola purchased quantities of the fish, which they brought up to town. The police at length ordered the whole to be buried. The first cases of the fever, as Mr. Barkley informed me, occurred in the neighborhood of some of the fish thus brought back.‡

I think it remarkable, that Dr. Merrill and Dr. M'Mahon of the army, who have written on this epidemic, said nothing of this vessel; and that I heard nothing of it, in conversing with many intelligent gentlemen of Pensacola, who were there at the time.

According to Mr. Barkley, the first deaths from yellow fever were on the 15th of August, after which no more occurred till the 25th; but Dr. M'Mahon (loc. cit.) informs us, that the first was on the 7th, in a lady recently arrived from New Orleans, who died with black vomit under the care of Drs. Elliot and Bronaugh, of the army. "About the same time," he adds, "two other cases of malignant fever occurred in a quarter of the town which had been considered the most healthy. Both these patients," he continues, "died with black vomit on the 12th, and on the 13th, the Board of Health publicly announced the epidemic, and advised all who could, to leave the town." Now we see, by this statement, that two deaths

* Med. Stat. of the United States Army, p. 36. † Phil. Jour. vol. ix. p. 238. ‡ Mr. Barkley.

with black vomit had occurred in a part of the town considered the most healthy on the 12th, and that the Board of Health had publicly announced the fever on the 13th; but, in the account Prof. Carpenter* has published, it is stated that the Alabama arrived *about the middle* of the month, and that a *few days* afterwards, the captain died on shore, of the fever. *After* his death, the lady at whose house he lodged, took the disease, and *subsequently* her daughter, *when* the boarders fled to different parts of the town, where most of them sickened, and nearly half died. It is impossible to read this narrative without feeling that the whole of it relates to events altogether posterior to the time when the two patients who died on the 12th were attacked; and who, it may be presumed, sickened as far back at least as the 8th or 9th. It would appear, then, that the arrival of the Alabama was a mere coincidence, and not the cause of the epidemic. This, however, would not prove that the family in which the boarders lodged, did not contract the disease from the captain; but, certainly, diminishes its probability, as they might have had it from the state of the atmosphere, which seems to have been prevalent before the arrival of his vessel.

Between the 13th and 20th, upwards of twenty deaths occurred. The disease now spread rapidly, and with a degree of malignity rarely equalled in the annals of this destructive malady.

The troops were as yet stationed in town, but on the 26th, they were removed to Camp Clinch, in the pine woods, up to which time they remained healthy. Not a case of fever appeared to originate in the cantonment, but a large proportion of the party left for a longer period in town, to guard the unremoved stores, fell victims to the disease. According to Dr. M'Mahon, neither age, sex, complexion, occupation, residence, nor birth, afforded exemption from the disease. Dr. Brosnaham, Mr. Barkley, and Mr. Areus, however, declare that the fever prevailed chiefly among the recent Anglo-Americans, and that but few Creoles were attacked. The greatest mortality was in September. Very few cases occurred after the 10th of October.† The whole number of deaths was 257,‡ or about a fifth part of the population of the town. Of the army, Dr. Bronaugh and Dr. Elliot were its victims. Of the troops at Fort Barrancas, seven died.§

In regard to the origin of this epidemic, two questions may be asked. 1st. Did the schooner with spoiled fish, from the Havana, import the fever, or fomites, from which it might have sprung? The answer must be in the negative, inasmuch as there was no case of it among her crew till after she had grounded near the mouth of the bay; and they were occupied in landing the semi-putrid cargo on the beach; a fact of which we have not only the declarations of all the people of Pensacola with whom I conversed, but the irresistible evidence that such was, at the time, believed to be her condition, from the fact that the people of the town went down, and purchased

* Observations, p. 35.
† Records of Town Council.
‡ Mr. Barkley.
§ Med. Stat. of Army.

liberally of the fish. 2d. Was the cause of the fever developed by the decomposition of the fish. I do not see that this question can be answered. The fact that the captain and several sailors were attacked with the fever, and died while transferring the cargo to the shore from the stranded vessel, would seem to indicate this; but it must be recollected, that they had been previously in the atmosphere of Havana, and had breathed that of Pensacola for ten days, where *if* the remote cause were afloat, they were, like the people of that town, acted upon by it. 3. Was the fever introduced from New Orleans by the lady who died before any other, on the 7th of August? This does not seem probable—is scarcely possible—inasmuch as the first admission for that disease into the Charity Hospital, in that year, was on the 1st day of September, three weeks after her death.

VI. SEASONS OF 1823, 4, 5, and 6, do not appear to have presented any case of the disease, though it was epidemic in two of those years, in 1824 and 1825, in New Orleans; and in one of them, 1825, in Mobile also. Prof. Carpenter, however, speaks of the disease as occurring in 1825, and is silent as to its prevalence two years afterwards. His reference doubtless was to the latter date.

VII. SEASON OF 1827.—I am indebted to Dr. Hulse, for many years the faithful, intelligent surgeon of the Naval Hospital, and to the official report of Dr. Lawson, now the active and efficient Surgeon-General of the Army,* for all I can say relative to the epidemic of this season.

The mean heat of the summer, did not vary half a degree from that of seven summers, of which this was one; but the temperature of July was the hottest which occurred during that period, and 1·8° above the mean of the whole.† Several nights of cool damp weather preceded the outbreak of the disease.‡

Of the time and manner of the first cases, I know nothing. The troops were quartered at Camp Clinch, and none had the disease except Dr. Lawson, who was attacked eight days after his last visit to the town, and a sergeant, who contracted it by lodging there one night. Certain staff-officers and their families, who resided in town, experienced the disease; and during their convalescence, were removed to the camp. The number of cases in Pensacola was not very great; and Dr. Lawson thinks the disease was on the whole less violent than that of 1822; nevertheless some patients died on the first day of the disease.§ As the epidemic of 1822 destroyed or drove away a large portion of the unacclimated, and as but few persons emigrated there afterward, the number liable to the fever was small.

According to Dr. Hulse, the fever was epidemic in Pensacola. It also proved fatal to an old Spaniard, Col. Noriega, who had long resided a few miles higher up the Bay, on a bluff bank. Whether he had visited the town before his attack I cannot say. In the Navy Yard, nine miles below, three fatal cases occurred, and here again, I am unable to say whether

* Medical Statistics of the U. S. Army, p. 58. † Army Meteor. Reg. ‡ Med. Stat. p. 58. § Ibid.

the persons had been in town. The Naval Hospital had no case, and was so healthy, that the surgeon, Dr. Salter, went to Pensacola to assist in attending the sick, where he contracted the fever.

At this time there were in the Bay, two of our national vessels, the Falmouth and Grampus, whose crews amounted to 250 men, and two Mexican ships of war were also there, *but not a single case occurred on board any of them.* The surgeon of one of the Mexican vessels visited Pensacola and went thence to Camp Clinch, where he sickened of the fever and died.

The fever this year prevailed in a greater number of places around the Gulf of Mexico than it had ever done before; and more patients were admitted into the Charity Hospital than had entered it in any preceding season.

VIII. Season of 1828–'33.—Through these six years the town of Pensacola appears to have been entirely exempt from the fever; within that period, it was once epidemic in Mobile, and four times epidemic in New Orleans. Its last visitation of the latter city, in 1833, was the gravest which till then had been experienced.

To what can we ascribe the continued immunity of Pensacola for six years? It was not to the want of yellow fever in the Bay on which it stands, as appears from the following facts, for which I am indebted to Dr. Hulse.

IX. Fever limited to Ships on the Gulf.—*The Natchez.* A.D. 1828. In the summer of 1828, the U. S. ship Natchez came into Pensacola Bay from a cruise. After lying at anchor for several weeks, the yellow fever broke out among her crew, and between fifty and sixty cases occurred. She was dropped down to the west end of Santa Rosa Island, and the men were placed under tents on its white sands, after which not another case occurred. Nobody in the town or Navy Yard was affected; and the sloop-of-war Falmouth, lying in the same harbor, had not a single case. Dr. Hulse informs me, that this disease was pronounced yellow fever by all the surgeons then in the Bay.

The Hornet. September, 1828.—After the U. S. Ship Hornet had been lying at anchor twenty-six days, near Sacrificios, a small island, about three miles from Vera Cruz, the yellow fever made its appearance among her crew. There was no epidemic in that city, except the dengue, nor had the vessel on her cruise touched at any place where yellow fever prevailed. During the two preceding months, the weather had been dry and oppressively hot.* In the preceding winter this vessel had undergone extensive repairs. She had been salted, and was very damp. On her return to New York she was broken out, and great quantities of mud and other filth were taken from her hold, and in her timbers and lower works, there was discovered a considerable collection of chips and shavings, in a putrid state, which had fallen

* Med. Stat. p. 58.

there during the repairs. The bilge-water and smell from the hold of this ship were exceedingly unpleasant.*

It should be recollected that the temperature of the Gulf water in the latitude of Vera Cruz, in summer, is up to 82°, and of course that of the hold of the ship was the same.

The Vincennes. 1831.—About the 6th of August, 1831, while the United States Flag-ship Vincennes, was lying in Pensacola Bay, the fever broke out among her crew. After twelve or fifteen cases had occurred, Dr. Hulse sailed from the Bay, but learned after his return, that many other cases occurred. The sick were taken to Camp Clinch. On examining the hold of the ship quantities of putrid rice, beans, and other articles which emitted a stench, were found. There was no spread of the disease.

In 1828, the fever was moderately epidemic in New Orleans, and sporadic in Mobile and Memphis; but did not occur elsewhere. In 1831, three cases only were admitted into the Charity Hospital, and none appeared out of New Orleans except those on the Vincennes.

By these statements of Dr. Hulse and Dr. Barrington we are driven to the alternative of questioning their veracity, or admitting that yellow fever may be generated on board a ship. Those who know them personally, will be the last to hang on the former horn of this dilemma.

X. SEASON OF 1834.—This year, according to Dr. Hulse, and Mr. Walter Gregory, now of Cincinnati, the Fever was epidemic, and did not limit itself like the last, to the town. The successor of Col. Noriega, mentioned above, an emigrant from New York, died of it, and cases occurred at the head of the Bay, and even in the pine woods. The army was now gone; but it invaded the Navy Yard, and all the vessels lying in the Bay.

Before any cases had occurred on shore, the crew of the U. S. Schooner Grampus began to sicken, on the 23d of August. She had been anchored in front of the town for several weeks. Six cases occurred the first day. The vessel was dropped down, and anchored off the Naval Hospital, to which the crew, sick and well, were transferred; every day a detachment of the latter was sent on board to purify and prepare the schooner for sea. The hold was foul and much of the flooring rotten; at night a watch was kept on board. Regularly a part of these men were attacked with the fever, some of them while still at work, and others on the following day. By the 11th of September eighteen cases had occurred, and in all, including some relapses, it was found at the end of the epidemic that there had been fifty-six attacks in a crew of sixty-two persons. Between the 27th and 31st of August another vessel, the Experiment, sent five cases to the Hospital, and afterwards nine more. She was a new and clean ship; up to the 12th of September, the other vessels lying in the Bay, remained exempt; but after that time, the disease appeared on every one. The number of patients finally in the hospital was seventy-eight. At the time it began to appear in

* Assistant-Surgeon Barrington, U. S. N. American Journal, No 24, p. 307.

vessel it attacked the inhabitants of Pensacola; and proved fatal to a nber.

t does not appear that any vessel had come into the harbor from Cuba any foreign port; but schooners were then, as since, regularly plying ween Pensacola and New Orleans, where the disease was epidemic that son. Was it then introduced from that city? No allegation of the kind ms to have been made; and such an origin cannot be admitted, as the first sent to the Charity Hospital that year was on the 28th of August, five s after the occurrence of the disease on board the Grampus, and when four cases had been sent to that establishment, the disease was pre- ing wherever there were people on or around Pensacola Bay. It is thy of remark that those two places were all which experienced a visita- this year.

XI. SEASONS OF 1835, '6, '7, AND '8.—Another period of immunity ceeded. The next four years did not present a single case. During this iod it was once epidemic and once sporadic in Mobile; twice sporadic and ce epidemic in New Orleans. One of these years, 1837, was signalized a greater number of admissions, 1194, into the Charity Hospital than ever occurred before; and during its prevalence, the intercourse with city was kept up.

XII. SEASON OF 1839.—It must be recollected, that this was the year which the epidemic affected a greater number of places, than ever before since. The town of Pensacola participated in the general visitation. The t cases occurred in unacclimated refugees from Mobile, who came with the ina of the disease in their systems. Subsequently it affected the ident population. Was this epidemic introduced by those who sickened th it after they arrived from Mobile? This question could only be swered by a minute and accurate history of the first cases among the resi- nt population, and such an account I was not able to obtain. *Prima facie,* was thus introduced; but in opposition to this conclusion we may refer two facts, neither of which, however, is conclusive. First. The annual ght, always more or less considerable, of the unacclimated from New leans and Mobile to Pensacola, in years in which the last remained healthy. cond. The extensive prevalence of the disease in 1839, apparently indi- ing a yellow fever epidemic constitution of the air.

But the disease was not confined to Pensacola. It occurred also on board ship of war Levant, and in the Navy Yard. According to Dr. Hulse, t a dozen patients were sent from the ship to the Hospital. It was not wn to him, that she had any more intercourse with the town than the er ships which were anchored near. Whether it appeared on her before fter it commenced in town, I cannot say. Of its occurrence in the Navy d, Prof. Carpenter, p. 27, on the authority of Prof. Wedderburn, gives following account.

"The first case that occurred at the Yard, was in a gentleman who had

just arrived from New Orleans, and who was sick at the house of Dr. ———, of the Navy. He died with black vomit, on the 5th of September. The Doctor himself, and a negro man who had nursed the gentleman, were taken sick simultaneously with the fever, a few days after his death. The next cases were other members of the Doctor's family, and several physicians and other persons, who attended on or visited the Doctor while sick. The infection then spread through the Yard."

XIII. SEASON OF 1841.—The year 1840 was exempt; but in 1841 the fever prevailed in the ships, the Navy Yard, and the town.

The following is the account of Dr. Hulse:—*

"The United States sloop-of-war the Levant came in from Vera Cruz, and as there were many cases of yellow fever among her crew, she was deserted, and the crew encamped in a large timber shed in the Navy Yard. The disease continued to prevail among the crew, but for two weeks it did not communicate to the inhabitants of the Yard. But at the end of this time it spread to the building nearest the shed, and finally through the Yard."

There is a conflict of accuracy between this gentleman, and Professors Carpenter and Wedderburn,† as one says it spread through the yard, and the other, that only two well-attested cases occurred there; still further, while Professor Wedderburn represents that when the vessel arrived from Vera Cruz, there were many cases of the fever among her crew, Dr. Hulse informs us, that she was anchored opposite the town of Pensacola during the month of August, on the last day of which the first cases occurred. Dr. Laurison, the surgeon of the ship,‡ confirms the statement of Dr. Hulse as to the outbreak of the fever. "While lying," says he, "in the Bay of Pensacola, the yellow fever suddenly made its appearance on board the sloop-of-war Levant, of which I was the surgeon. The invasion of the disease was equally sudden and unexpected. On one day we were comparatively well, and in the evening had several cases of fever, which continued to develop itself among the crew and officers, until in the progress of the epidemic, out of a complement of 160 souls, not more than fifteen escaped an attack, in some form or other." After speaking of the landing of the men at the Navy Yard, and saying that this produced no abatement of the disease, he adds, "For a few days, the fever seemed to be confined exclusively to our ship's company; but soon, however, some fatal cases occurred in the town of Pensacola, and on board the French vessels lying in the Bay." We are not told whether Prof. Wedderburn made his statement from personal observation or the report of others; Dr. Hulse and Dr. Laurison wrote from personal observation. If we take their statement of the length of time which elapsed after the vessel reached the harbor of Pensacola, and manner in which the disease broke out, it was not introduced from Vera

* Balt. Med. and Surg. Journ., April 1842, p. 392. † Sketches, p. 29.
‡ Same Journal, June No. 1843, p. 393.

Cruz; and as, according to both these gentlemen, it did not appear in Pensacola and on board the French ships till after it appeared on the Levant, it was not received by the ship from the town, and must therefore have originated on board of her. It may be asked, then, Did not this ship infect the town, the Navy Yard, and the French ships? This must be granted as possible; but if the fever could originate in the first, it *might* originate in all the rest. If the Levant did not receive it from without, it is a presumptive analogy that it did not communicate it.

XIV. SEASONS OF 1842, '3, 4, AND '5.—Exempt. Within those years twice epidemic in New Orleans and once in Mobile.

SECTION VI.

ST. JOSEPH'S, APALACHICOLA BAY, AND TAMPA BAY.

I KNOW nothing of the occurrence of yellow fever at the first and last of these places, but from a reference by Dr. Monette* to its occurrence at both, in the great epidemic season of 1839. Of the former place, he says, it was "ravaged," of the latter, "many of its inhabitants died." No details are given nor authorities cited. Dr. Hort,† informs us that in 1826 some men died of yellow fever on Apalachicola Bay. They came from Baltimore with merchandise destined for the interior. There was at that time no settlement at Apalachicola, and no commercial intercourse with the West Indies.

SECTION VII.

KEY WEST, OR THOMPSON'S ISLAND.

I. SEASON OF 1824.—Key West, as a part of Florida, became a portion of the United States in the year 1821. Having a tolerable harbor, it was for a time made a naval rendezvous, and in 1824 the military and marine forces ordered there were very considerable. A number of armed vessels were anchored in the harbor, and the land forces were stationed on shore. According to Dr. Ticknor they were greatly addicted to intemperance, ate salted meats, a coarse seabread of a bad quality, and a few dry vegetables: their fatigue duty was exhausting; and at night they lodged in the second story of buildings with roofs, but open on the sides, whereby they were exposed to the dampness, which, under the reduction of only 8 or 10 degrees of heat, in an atmosphere saturated with moisture, was very great. Such were the conditions under which the disease made its appearance. It affected almost every soldier or marine who lodged on the island, and some of the ships' crews

* Observations, p. 122. † New Orleans Med. Journ. vol. ii. p. 5.

who came on shore; but none, as far as he knew, who remained all the time in the ships. The population of the village consisted of about sixty or seventy poor people, some of whom were blacks. Many of these inhabitants had long resided on the island, or in other places in the South; but were now affected as well as those engaged in the public service.* We are not told at what time the disease commenced, nor whether any ship arrived there from Cuba or any other yellow fever port immediately before the onset of the fever. Indeed Dr. Ticknor writes of it as if it could have had no other than a local origin. We may presume that if any vessel having the fever had come into port he would have referred to the fact, although he might have denied the introduction of the disease; but still it would have been more satisfactory to have been told whether it could have been then imported, supposing it an importable disease.

The fever this year was moderately epidemic in New Orleans, and sporadic in Mobile, prevailing nowhere else within our limits. Prof. Carpenter has not mentioned this epidemic.

CHAPTER IV.

LOCAL HISTORY—PLACES TO THE WESTWARD AND NORTHWEST OF NEW ORLEANS.

HAVING completed the history of the origin of yellow fever in places east of New Orleans, let us now turn westward, by beginning with

GALVESTON.

TOPOGRAPHY.—The medical topographer and yellow fever historian of Galveston, is Dr. Ashbel Smith;† but in addition to his valuable publication I have before me the notes of a conversation with Dr. Dickerson, now of Natchez, who at one time resided in the former.

Galveston is a long narrow island, separated from the continent by the bay of that name, and a narrow strait. Its general course is nearly southwest and northeast. Its elevation so little above the surface of the Gulf, that portions of it are liable to inundation when the waters are moved by strong winds. Composed chiefly of sand, it still has soil enough to support an herbaceous vegetation. At the depth of a few feet below the surface fresh water of a tolerable degree of purity may be obtained.

The town is situated on the east end of the island. Its principal street, called the Strand, is on a flat terrace, or levee of sand, thrown up by the

* North American Med. and Surg. Journ. vol. iii. p. 213.

† An account of the Yellow Fever which appeared in the City of Galveston, in the Republic of Texas, in the autumn of 1839.

waves, in the rear of which and parallel to it, is a long narrow quagmire, which the tides overflow. Beyond this morass, the surface is higher and drier. Many of the houses are built over this morass, in which a great deal of filth is suffered to accumulate. The ships lie in front of the Strand. The latitude of the town is 29° 18′ north, its longitude, 96° 6′ west.

CLIMATE.—The mean temperature of Galveston has not been made out. The south wind, directly from the Gulf, is balmy, with a clear sky. East and northeast winds are *harsher;* and the north and northwest winds, which begin to blow in October, bring great and sudden coldness.

AGE AND POPULATION.—Galveston may be said to have begun in 1836, and at the end of three years, it had about 2000 inhabitants, chiefly emigrants from the United States, lodged in new frame houses. Throughout these years it remained exempt from yellow fever, and suffered but little from intermittents and remittents.

YELLOW FEVER OF 1839.—Throughout the summer of this year the town was healthy, the few violent cases of fever which occurred having been contracted elsewhere.

On the 27th or 28th of September, according to Dr. Dickerson, a steam-packet arrived from New Orleans, with a case of what was regarded as yellow fever. The patient died four days afterwards, without presenting decided symptoms of that disease. On the 28th, the cook of a vessel from Boston, anchored sixty or eighty feet from the steamer, was taken with fever. On the 1st of October he was brought to Dr. D.'s office. On the night of the 2d he died with black vomit. While these cases were occurring, that is, within the month of September, according to Dr. Smith, Mr. Tickenor, who kept a retail store on the Strand, sickened and died with black vomit; and near the same time, Mr. Lang, living opposite Mr. Tickenor, sickened of the same disease, but recovered after having had hemorrhage from the gums. On the 27th, Mr. Abrahams was seized with the same, and when Dr. S. saw him on the 30th, his symptoms were well marked. He died the next day with hiccough, black vomit, and a yellow skin. Two other cases occurred almost simultaneously with this, and the 30th produced several more. The disease continued to rage till the 9th of October, when it was suddenly arrested for a period of two days and a half.

"On the 30th of September, and for some days previously, strong easterly winds prevailed, with cloudy weather throughout the twenty-four hours. From the 1st to the 5th of October, the wind blew from the east and northeast, in the morning, it hauled round to the southeast and near south, in the course of the day and evening, gradually becoming lighter, and dying away in the fore-part of the night, and regularly springing up about daybreak, with stiff breezes from the northeast and east. We afterwards had light southeasterly and southerly breezes, throughout the twenty-four hours, with occasional lightning and a few drops of rain about midnight, until the morning of the 9th October. At this time a stiff norther set in, with drizzling rains,

which lasted till the middle of the forenoon of the 11th. From the 30th September to the 9th October, the thermometer ranged at midday in the shade, from 84 to 88 degrees. On the 9th it stood at midday at 69½, on the 10th at 66½, on the 11th at 79, on the 12th at 80 degrees. Within the fifteen hours immediately preceding the norther and fall of the mercury, I was called to eight new cases, and I have been informed of some others. During the prevalence of the norther, I do not believe, after careful inquiry, a single new case occurred. Subsequently the epidemic reappeared in a somewhat mitigated form—the first fresh attack recurring, I believe, about 5 P. M. on the 11th. Subsequently to this date the thermometer ranged generally from 80 to 85½ degrees at midday—descending one day as low as 70 degrees, with variable winds, chiefly between the northeast and south, until the morning of the 5th November, when a stiff norther set in, which blew three days. The thermometer on the 7th stood at 45 degrees in the morning, and 58 degrees at midday. There was on the night of the 6th and 7th a slight frost, which it is hoped has put an end to the epidemic. It may be observed here, that although the northers prevented new cases, they were believed to be pernicious to persons previously attacked."

According to both Dr. Smith, and Dr. Dickerson, the people who lived beyond the morass and did not visit the Strand, remained free from the disease. The latter states that the mate and two of the crew of the steamer from New Orleans, died of the fever, in the course of the epidemic.

Dr. Monette* and Prof. Carpenter† inform us that the fever was introduced from New Orleans, but do not assign the vessel. Dr. Dickerson, however, supplies the omission, by designating the steamship which arrived from that city on the "26th or 28th." Dr. Smith, on the other hand, is silent as to importation, and evidently regards the disease as of local origin. From a comparison of dates it is quite obvious that if it were imported, the vessel that brought it has not been discovered; for, first, it was not certain that the patient in the vessel referred to really had yellow fever; and second, several cases occurred on the Strand so early as to prove fatal even before the death of that patient.

On the whole we may conclude that as both the alleged conditions, local filth and commercial intercourse with a city where the fever prevailed were present at Galveston, the origin of this epidemic remains undetermined.

SEASON OF 1844.—[MSS. wanting.—ED.]

FRANKLIN.

SEASON OF 1839.—Franklin, although maintaining at all times a regular commercial intercourse with New Orleans, seems to have had no visitation of yellow fever till this year, though there is a traditional account of some cases twenty years before. The account given by Dr. Monette,‡ on whose authority he does not tell us, is as follows:—

* Observations, p. 115. † Sketches, p. 27. ‡ Observations, p. 111.

ached Franklin. This boat proved to be infected; for several per-
ed who had not been exposed to any other source of infection, and
re attacked with yellow fever a few days after having made a visit
boat. The clerk of the parish court was one of them. In less than
after this boat arrived at the landing, several persons in that imme-
icinity took the disease, and also died. The disease was considered
ie after the 15th of September, and did not cease until checked by
rly in November. The number of deaths in the village and vicinity
ut twenty-five; the whole number of cases about forty-five."

Carpenter,* on the authority of Mr. Wilson, a citizen of the place,
he following account.

troduced from New Orleans, under the following circumstances.
communication, between New Orleans and Attakapas, is seldom
ntil towards January, and then the boats run through the Bayou
mines. In October, 1839, the steamer Tomochichi was placed on the
te. On her first or second trip from New Orleans, where the yellow
as epidemic, to Franklin, Henry Thompson, of the latter place, was
the few persons who went on board of her. He was taken sick with
fever in a few days afterwards, and was the first who died with black
in the village. It was remarked, that nearly all those who visited
ok the disease, and many of them died. Mr. Birdsall's family were
ticularly attentive to him, and they were all ill, and several of them
The neighbors who visited Mr. B.'s family were all taken sick, and
sease throughout could be traced by infection from one case to
r."

difficult to reconcile these statements. That of Dr. M. represents
amboat to have arrived the first week of September, that of Prof. C.
ober, two weeks or more after the fever, according to Dr. M., had
epidemic. The latter gentleman states that she arrived with the

first who died in the village, and that the epidemic spread from him. These are evidently two distinct histories; and I now proceed to add a third.

When at Plaquemines, head of the Bayou of that name, in May, 1844, I met with Dr. Joseph L. Horsby, then a resident of that town, but in 1839, residing in or near Franklin, who gave me the following statement.

Henry Thompson, mentioned by Prof. Carpenter's correspondent, was the first individual attacked with the fever, nearly all the characteristic symptoms of which were present, except hemorrhage and black vomit. He was clerk of the Court, as stated by Dr. M., proving that he and Prof. C. refer to the same boat, and also, assessor of parish taxes, and in the prosecution of his duty he had ridden over the prairies for two weeks in the hot sun. On the 2d day of September, two days after his return home, and without having been on board any steamer, he was taken down, and died on the night of the 7th. The steamer Tomochichi arrived on the morning he was buried. The steamer was said to have a case of yellow fever on board. She laid at the wharf only a few minutes, landed some goods, and resumed her voyage up the Bayou Teche.

Dr. H. attended the patient Thompson, and collected his history. No other case occurred till the 22d of September, a fortnight after the funeral of the person just mentioned, when two others were taken down on the same day, and both died. They were attended by himself and his partner, Dr. Ethan Allen. Of these two patients, one was an elderly lady, who seldom went from home; the other, Anderson, a clerk in a store, which had not received goods by the boat from New Orleans. This young gentleman boarded in the family of Mrs. Birdsall, mentioned by Prof. C.'s informant. That gentleman had been to the Eastern States, and reached home the night that Anderson died. On the 26th, an itinerant dentist, last from St. Martins, on the Bayou above, after having been only three or four days in the village, was seized and died with black vomit, in the house of Mr. Scott. On the 1st day of October, Birdsall was not well, and his wife on the 2d had an attack of the fever, from which she recovered. On the 5th he went a mile into the country, to the house of Mr. Parkinson, where he got worse, and died on the 9th. On the 15th Mr. P. was taken sick, but not with yellow fever; his family remained in health. On the 28th of September, Northrop, who during Thompson's illness was in the country, suffered an attack, which proved fatal on the 1st of October, with black vomit. No other member of the family had the disease. On the 4th of October, Hartman, a Creole, who had visited Thompson, was seized, and expired on the 10th, but his family remained healthy. On the 8th of October, Johnson, who had had no special intercourse with any of the sick, was attacked, but his family escaped. On the 3d of October, Mrs. Dwight, who lived two miles in the country, came into town and went to Mr. Scott's, where the dentist had died three days before. On the 8th she was attacked, and died on the 11th, with all the characteristic symptoms; but no member of her family or

and mulattoes. Three or four of the former experienced attacks, hich they recovered: one of the latter died. Dr. Horsby affirms knew of persons who came in from the country, and only walked ets without entering a house, who were seized with the disease after urned home.

oking at the three histories of this visitation, we are compelled, I n the absence of other testimony, to admit, that, although the fever re been imported, the case is not made out, and that we must look re for decisive facts as to its origin.

NEW IBERIA.

ON OF 1839.—I have no account of yellow fever in this village before 1839. Of its appearance there, Dr. Monette,* on the authority of . B. G. Teany and other intelligent men, gives the following account: illage continued very healthy until the 10th of September, when yellow fever began to present themselves in the persons of those l recently arrived from New Orleans, by way of the Plaquemines. re the first cases of yellow fever in New Iberia, in 1839. I am not that the disease was ever there before.

after the first cases of this kind, the disease began to spread among the place who had been exposed to no other source of infection steamboats, the sick, and the fomites imported in those boats. The umber of deaths, in and near this town, was about twenty.

pport of this statement, I have received from Dr. Abbay, now of bson, Missouri, but in 1839, of New Iberia, the following narrative. h a regular steamboat intercourse, twice a week, had been maintained Iberia and New Orleans, where the fever had been epidemic for s, by the Mississippi River and Bayou Plaquemines, no case of the d been seen in the former up to the 10th of September. On the

seventeen persons who had been much exposed to the atmosphere of the other patients, were taken down, and the next day Dr. A. himself was seized.

Prof. Carpenter,* however, gives, on the information of Drs. Cook and Taylor, of Opelousas, who had it from others, a different statement. "The circumstances of the introduction of yellow fever into this village in 1839, we are told are as follows: A young physician, Dr. Smith, died of the disease at Plaquemines, and his remains were carried to his friends in New Iberia, and were exposed in the village church, according to the usages of the Catholics. Many persons who entered the chapel for the purpose of seeing the remains, or for other purposes, took the disease, and many died with black vomit, and the disease was communicated from them to others."

From Daniel Avery, Esq., of Baton Rouge, who at that time was a sojourner in New Iberia, I have received an account substantially the same as that given by Prof. Carpenter. The tin coffin in which the remains of Dr. Smith were enclosed was so badly made that an offensive fluid oozed from it, so Mr. Avery and a number of others had it removed to a sugar-house out of the village, and thence carried to the grave. At that time there was no fever in the village, but soon after the funeral all who attended were attacked, except himself and another, who had experienced the disease before.

From Dr. Clements of Plaquemines I learn that Dr. Smith died on the 12th, the very day on which several cases occurred in Iberia. Thus if the exhibition of his remains two or three days afterwards excited the disease in the people of Iberia, it was introduced into that village in two different and successive modes. But are we at liberty to conclude that it was in fact introduced by *either?* If so contagious as that Dr. A. could by visiting a patient transmit it to his wife, how could it have happened that it should have been mortally prevalent for six weeks in New Orleans before it was carried to Iberia? And what reason can be assigned for its nearly simultaneous appearance in most of the smaller towns of the delta of the Mississippi about the 8th or 10th of September.

ST. MARTINSVILLE.

Till 1839, as Dr. Monette† informs us, yellow fever had been unknown in St. Martinsville; but several cases now occurred in fugitives from New Orleans. It did not, however, become epidemic in the village. Whether any cases occurred among the resident population does not appear. Prof. Carpenter‡ merely says, "Introduced from New Orleans."

OPELOUSAS.

The first occurrence of yellow fever in this town was in the

SEASON OF 1837.—The following account from Dr. T. A. Cooke of that place, in a letter to Prof. Carpenter is all that I know of this invasion.

* Sketches, p. 28. † Observations, p. 114. ‡ Sketches, p. 28.

ns, and who speedily after his arrival in Opelousas was violently
ed with fever, which terminated fatally in a few days with the black
. The next case was that of Victor Miramond, resident for many
who attended Emile Bassant in his dying moments, and followed the
to the grave. In about twenty-four hours after the funeral he was
tly attacked, and in four days he was dead. He threw up an immense
ity of black matter. From and after the 1st of November, the disease
ally extended for some three or four weeks, after which period it
ally subsided, but did not disappear until after several severe frosts."
s to be regretted that Dr. Cooke did not say whether the gradual ex-
n of the fever occurred successively from those antecedently affected.
ct as it stands goes strongly to establish the contagious character of
ease, but the two persons he has named might have been taken down
patient from New Orleans had not come, provided the disease origi-
independently of contagion.

ASON OF 1839.—The next invasion at this place was in 1839, and was
according to Dr. J. A. Taylor, in the following manner:* On the 16th
gust, Fisk, an unacclimated man, who had spent four or five days in New
s and then departed for Opelousas, was brought from the landing to the
e. He was ill of a fever that did not show the symptoms of ordinary au-
l fever, and Dr. Taylor requested Dr. Cooke and Dr. Jewell to attend
sultation. On the 21st he died with black vomit. From that time
e 14th of September, twenty-four days, the fevers in Dr. Taylor's
ce were of a mild and manageable character; but Dr. Hill informed
rpenter (p. 61), that on the 2d of September, twelve days after the
of Fisk, Hartshorn, who nursed him and attended to the funeral ar-
ments, sickened and died with black vomit on the 7th. Immediately
he 14th the fever became epidemic. Dr. Taylor has given the dates
cases for a week, but makes no reference to their having had com-

had three in as many days, each being taken down on the day of entering on duty.

I cannot concur with Prof. Carpenter in the conclusion that these facts establish the importation of the fever into Opelousas. The lapse of twenty-four days after the death of Fisk, during which but one case of the fever occurred, and its sudden epidemic prevalence immediately afterwards, seem to me irreconcilable with the *known laws of contagion*. It will be observed, moreover, that this epidemic invasion was nearly cotemporary with that of Franklin and New Iberia, and nearly two months after the disease had begun to prevail in New Orleans, during which time there had been constant intercourse between the two places. Dr. Monette,* apparently unacquainted with the detail of facts here given, by the medical gentlemen of Opelousas, presents us, but on what authority we are not told, with the following history:—

"This village has long been a resort for many of the inhabitants of New Orleans, when compelled by the epidemic to retire from the city; and in no case have I been able to learn that yellow fever has been ever communicated, in its epidemic form, to the inhabitants, until the autumn of 1839. This year the health of the place was uninterrupted until the 1st of September, when cases of this disease began to manifest themselves in the persons of those who had recently arrived from New Orleans. For ten days it was confined exclusively to the people of New Orleans, and these recently returned from that city, with whom the village was thronged. Cases multiplied daily, and by the middle of September it was considered as epidemic, when most of the people deserted the place. The disease was epidemic until November, when the number of deaths had increased to *forty-seven*, of whom seventeen were natives of the place."

It cannot but appear remarkable that Dr. Taylor should have been ignorant of this prevalence of the disease through the first two weeks of September, and that another physician, Dr. Hill, should have known of but a single case, and the patient not one of those who came from New Orleans. The continued contrariety between Prof. Carpenter and Dr. Monette, relative to the appearance of the disease in the towns of the Bayou Teche, is indeed well calculated to diminish confidence in the accuracy of their informants. It shows indeed that in each of those towns there was difference of opinion as, to the mode of origin of the fever. All this is very much to be regretted, as, from their detached position and limited population, it might have been expected that the question of importation would have been there definitively settled.

SEASON OF 1842.—The following is Dr. Carpenter's account of the onset of this epidemic:—

"Introduced from New Orleans. The first case was a French peddler, named Etienne Franquez, who had been to New Orleans, where the disease

* Observations, p. 114.

immediately succeeded, and the disease soon became epidemic."

ALEXANDRIA.

transition from Opelousas to this place is not unnatural, as the dis-
is not great, and they both lie off to the west of the Mississippi River.
xandria is situated on the right bank of Red River, in north latitude
31°18′, at the distance of 100 miles up that river, and 336 from New
as.

m indebted to Dr. Monette* for all that I can say concerning yellow
t this place. It appears never to have occurred till the remarkable
ic in the year of which I am about to speak.

SON OF 1839.—In July, the weather was insupportably hot and very
ut healthy. But the river was high and continued so through the
of August,—swarms of emigrants to Texas meanwhile adding to
pulation of the town and that of the boats. Early in September, every
steamboats brought persons from New Orleans with the semina of the
in their systems. Cases of the fever immediately began to manifest
elves in the boarding-houses near the landings, and by the 20th it was
ent over the whole town, and raged till checked by cold weather about
t of November. The majority of all the deaths and cases occurred
emigrants, boatmen, or transient persons from New Orleans. Persons
prudently ventured into the city, were attacked on returning home.
ckson and others assured Dr. Monette that there was not a case in
ill after the disease had appeared on board three steamboats that plied
n that place and New Orleans, and that the first spread of the disease
om the boarding-houses where patients from these boats had been

NATCHITOCHES.

On these two accounts I may remark that yellow fever appeared in Alexandria under the combined influence of a crowded population, busy wharf, and the arrival of boats with yellow fever from New Orleans. In Natchitoches, only one of these influences, namely, the importation of yellow fever cases, existed, and yet the fever did not spread among the residents. It appears then, that the fever of 1839, at Natchitoches, was not contagious—could not propagate itself; why then did it propagate itself in Opelousas?

THIBODEAUXVILLE.

SEASON OF 1839.—Prof. Carpenter is silent as to yellow fever in this village. Dr. Monette, p. 102, informs us that, as the water, at the efflux of the Bayou from the Mississippi, at Donaldsonville, was in autumn too shoal to admit of the passage into it of the New Orleans steamers, the boats on the Bayou ascended, but did not pass out of it, bringing down persons to Thibodeauxville.

In this place the population enjoyed uninterrupted health, in the fall of 1839, until many persons arrived from New Orleans, towards the last of August, for retirement from the epidemic. The first five or six cases of yellow fever were unquestionably in persons recently from that city; and none pretend to question the fact that these cases were introduced from New Orleans. Cases occurred subsequently during the month of September, until the whole number was about twenty-five. Some of the latter could not be traced to New Orleans, but to infection or fomites introduced from that city. The disease did not prevail as an epidemic, for the greater number of cases were contracted in New Orleans. Mr. W. B. Shields, an intelligent planter in that region, assures me of these facts. The number of deaths in this town was about fifteen.

CHAPTER V.

PLACES UP THE MISSISSIPPI FROM NEW ORLEANS.

DONALDSONVILLE.

WE now come back to the Mississippi River and find ourselves on its right bank, at the efflux of the La Fourche, in the latitude of New Orleans, and seventy miles above that city.

SEASON OF 1839.—Being the first town above New Orleans, and situate at the mouth of a navigable bayou, the banks of which have long been thickly inhabited, and where transshipments are made, no place could have been more exposed to any influence which New Orleans can exert on other places, in yellow fever seasons, than this, and still it was not till 1839, that

t experienced the fever. Of this visitation, Prof. Carpenter gives us no letails, but Dr. Monette* has the following statement:—

"During the summer of 1839, Donaldsonville, like all other towns on the Lower Mississippi, was remarkably healthy until the 1st of September, when yellow fever had been epidemic in New Orleans for more than two weeks. This state of health continued uninterrupted until after ten or twelve cases of yellow fever had been introduced from New Orleans by the boats, besides a few persons who arrived from the city with the infection dormant in their systems, and soon after were attacked by fully-developed yellow fever. These cases were all taken to the public hotel, or to other houses in that vicinity, and near the steamboat landing. At length, towards the middle of September, the local atmosphere was contaminated, or infected, and other persons who had not been exposed to any other source of infection contracted yellow fever and died, after having been more or less in the newly-infected district. The remainder of the town continued healthy. Among the first persons attacked in Donaldsonville, after the first imported cases, were several persons who had visited, nursed, and sat up with the sick. The disease continued to spread slowly until frost, when about thirty deaths had occurred, besides the first imported cases. This statement is given upon the authority of Col. H. T. Williams, Surveyor-General of Louisiana, and of Mrs. C. M. Thayer, both residents of that town."

I have three remarks to make on this statement. The disease began in New Orleans on the 23d of July, and prevailed more in August than any other month of the season, 482 patients having been admitted into the Charity Hospital in that month, while only 361 were received in September, yet it was not till the middle of the latter month, nearly eight weeks after its advent in New Orleans, that it began among the resident population of Donaldsonville, notwithstanding the daily intercourse. What cause prevented an earlier play of the contagion? Now the middle of September, as we have seen, was the time when it became epidemic in the towns on the Bayou Teche. 2d. It appears that there was a district in Donaldsonville, whose atmosphere gave the disease to those who visited it, the remainder of the town having a salubrious atmosphere. 3d. Among the first persons attacked after the imported cases, were several who had visited, nursed, and sat up with the sick, from which it appears that the disease occurred in others who had not been thus exposed.

Seasons of 1840, '1–'3.—Dr. Sabin Martin informs me that in 1840, when scarcely a case occurred in New Orleans, a man came from that city to Donaldsonville, sickened there, and died with all the characteristic symptoms of the fever, but no other case followed.

In 1841, a family left Baton Rouge, in a flat-boat, for Donaldsonville. There was no yellow fever that year in the former town, or in the intermediate town of Plaquemines. This family had been two years from France.

* Observations, p. 96.

When they reached Donaldsonville, the father and his oldest daughter were ill with the fever. Dr. M. was called in, and found the former walking about his room, and saying he was not sick. In three days, however, he died with black vomit, and his skin became yellow after death. The daughter had all the characteristic symptoms of yellow fever, and died in four days, previously to which she had suppression of urine, her skin became yellow, and she threw up great quantities of black vomit. The mother and two younger children escaped the disease. Dr. Cotman, apart from Dr. Martin, gave me the same account. No other cases followed. The fever was this year epidemic in New Orleans, Pensacola, Port Hudson, above Baton Rouge, and Vicksburg.

In the autumn of the year 1843, a young woman, from the country parish of St. James, below Donaldsonville, came to the neighborhood of the latter place, in the month of October, where she sickened and died with the characteristic symptoms.

Earlier in the season, a man on Front Street died of the disease, but did not communicate it. A German, also, died of it in the midst of a house full of his countrymen, who escaped. There was no allegation at the time of these patients having been on board of boats from New Orleans.

In the latter part of October, Duchesne, a play actor, who had left New Orleans three months before, to escape the fever, was seized with it. Immediately before the attack, he had been for some time fowling around a lake several miles in the rear of Donaldsonville. He expired in three days and three hours from the sudden commencement of his disease. In twenty-eight hours from the beginning, he had great irritability of stomach, head and back ache, and a yellow skin; in thirty-six hours more, suppression of urine and black vomit; fourteen hours before death, he suffered from a slight hemorrhage. This patient had not been near any one with the fever. Nobody took it from him.—DR. MARTIN.

Here, then, we *seem* to have genuine cases of yellow fever, not traceable to contagion or fomites. In the case of the play actor, it must be admitted as a possibility that his system was impressed by the remote cause before leaving New Orleans. The young woman from the parish of St. James might have visited New Orleans after the disease became epidemic; and the German and the tinner on Front Street might have gone on board of steamers from the city, and therefore their cases cannot be referred to as examples of origination from endemic causes; but in the case of the Frenchman and his daughter, there appears to be no room for any such suppositions.

This year the fever was epidemic in New Orleans, Mobile, St. Francisville, Port Hudson, Rodney, and Vicksburg, and sporadic in Baton Rouge, as well as Donaldsonville.

PLAQUEMINES.

I am indebted to Dr. Charles Clements, who, after residing for three years

r of the neighborhood, after having played billiards all night in town, eized with the fever, and died in four or five days, with yellow skin lack vomit. This was the first case. The second was that of Hanna, who aken on the 3d of August, and died with the characteristic symptoms ee or four days. Nothing was said of his having been on board a boat. Quite a number were seized about the same time, in different of the town. Those who were receiving and forwarding goods, were ore affected than others. The Creole who died had not received any. g the epidemic, three men came from the country, and remained in ll night. The whole suffered attacks after returning home, and two but no one took the disease from them.

s year the disease began in May, and continued to appear in June. It cidedly epidemic in New Orleans and various other places on the Gulf ver coasts. Neither Professor Carpenter nor Dr. Monette has noticed sitation at Plaquemines.

SON OF 1833.—In 1830, the fever was epidemic in New Orleans, and and '32, slightly sporadic, but Plaquemines remained exempt. In the city suffered a violent invasion, and Plaquemines was the only place affected; it was, however, sporadic. A young man, Desbrow, from the city and died with it, but there had been cases before his

SON OF 1837.—Between this and the preceding epoch, the disease ice epidemic at New Orleans, but Plaquemines remained free. This here were a few cases, but no allegation of its being introduced.

SON OF 1839.—The autumn of 1838, as far as Dr. Clements recol- presented no case; but in that of 1839, there were more cases than Dr. Smith, whose case was mentioned when speaking of New Iberia, first victim, and he was taken on the 7th of September. Thus it

no one took the disease. In 1843, another case of the same kind, but no spread of the disease. In September, 1843, as the same gentleman told me, a Creole, living on the opposite side of the river, spent an hour on board a steam-packet bound from New Orleans to Baton Rouge, the fever prevailing in both places. He had influenza at the time. Symptoms of yellow fever supervened on the second day after his visit, including, before he died, yellow skin, suppression of urine, and black vomit. None of his family contracted the disease, but it was *said* that a relative, who visited him, did. As Dr. Hiriart had spent four years in the Charity Hospital of New Orleans, I cannot doubt his accuracy.

BATON ROUGE.

Dr. French went to reside in this old French village in 1808, and did not see a case of yellow fever till the year 1817, when he was himself attacked; showing that a residence of nine years in the South had not given to his constitution a power of resistance to the remote cause of this malady. From this gentleman, as well as from Dr. Harney, Surgeon U. S. A., who has been stationed at the barracks of this post most of the time since 1818, I learn that there are no traditional accounts of the fever at an earlier date than that just mentioned. Meanwhile, it had been epidemic in New Orleans seven times. I also learn from two citizens, whose memory goes back as far as Dr. F.'s residence there, the same thing. These gentlemen will be my chief authorities.

SEASON OF 1817.—The fever was epidemic this year, but I have not been able to obtain any history of its rise. It was also epidemic in New Orleans and Natchez.

SEASON OF 1819.—Again epidemic, but no history of it can be written. Prevailed at the places just mentioned, and also in Mobile.

SEASON OF 1822.—Epidemic and mortal. More than sixty deaths. No history. Prevailed, also, in New Orleans, and on Mobile and Pensacola Bays.

SEASON OF 1827.—Sporadic in the latter part of autumn.—HARNEY. Prevailed in New Orleans and Pensacola as an epidemic, and sporadically in Mobile, Bayou Sara, Natchez, and Vicksburg.

SEASON OF 1829.—From 1817 to 1829, although yellow fever had appeared in New Orleans every year except two, it visited Baton Rouge but four times. In 1825, when the fever broke out in the city, it extended to the troops in the New Orleans barracks, which, after the occurrence of three cases, were, on the 1st of August, removed to Baton Rouge, where they continued in good health.* Its fifth visitation was this year, and its introduction, according to Prof. Carpenter,† as follows:—

"This year many Spaniards fled to New Orleans, in consequence of the political revolution which had taken place in Mexico. Soon after their arrival

* Statistics of U. S. Army, p. 46. † Sketches, p. 26.

in New Orleans, the yellow fever appeared, and they removed to Baton Rouge. But they had been exposed to the infection, and the yellow fever appeared among them about the time of their arrival at Baton Rouge, and many of them died. The disease was soon communicated to the resident population, and raged with great mortality."

When in Baton Rouge, I made every possible effort to obtain a detailed account of the origin of this epidemic, but after the lapse of fourteen years, and the removal of most of the Spanish exiles, the acquisition of full and correct information was impracticable. The epidemic was one of the earliest which New Orleans has experienced, for a patient was admitted into the Charity Hospital on the 26th of May, and by the 7th of June, the twelfth had been introduced. As to the time when the Mexican refugees left New Orleans, I could not acquire specific information, but was assured that they began to come in the spring, and continued coming till in the summer, consequently till after the time when the fever had begun to prevail in New Orleans. I could not learn that any of them had the fever at the time of their arrival. All accounts agree that it was chiefly among them, which Dr. Harney* ascribes to "their mode of living, their filth, and their crowded condition." It is certain, however, that a number of citizens and soldiers died of the disease, and it appears to have affected them first. If the fever had never prevailed there before, these facts would certainly seem to indicate its importation. The fever was epidemic this year in Mobile, Plaquemines, St. Francisville, and Bay of St. Louis, and sporadic in Natchez.

For the ensuing thirteen years, after 1829, Baton Rouge remained exempt, during which the fever was eight times epidemic in New Orleans. Prof. Carpenter has marked it as prevailing in 1837, but Dr. Harney and Dr. French assured me that it did not. In 1839, when it prevailed so extensively throughout the South, Dr. Harney observed, both in town and country, a mild fever, in which the patients frequently vomited a dark-colored fluid, which, however, had not the characteristics of true black vomit.

Season of 1843.—Dr. Harney informs me that it prevailed this season chiefly in the garrison, where there was great mortality in proportion to the number of cases. He does not admit the existence of any facts showing that it was imported. Prof. C.† says—"The disease appeared here in October. There was daily communication with New Orleans."

This is equally true of the eight years just mentioned, when no fever appeared in Baton Rouge. The seasons of 1844–5 were exempt.

PORT HUDSON.

Season of 1839.—It does not appear that this place was ever visited with the fever till the noted year 1839. Speaking of it, Prof. Carpenter, (p. 27), says—"Introduced from New Orleans." Dr. Monette (p. 98),

* Statistics of Army, p. 258. † Sketches, p. 30.

says—"During the month of September the yellow fever was introduced among the merchants, clerks, and laborers, and about fifteen of them died. Others from the country contracted the disease." Dr. Monette does not tell us of whom he obtained his information. Major Marks, now of Bayou Sara, but then of Port Hudson, informs me that the first two patients were merchants and brothers, who had not received goods from New Orleans immediately before, but might have been on board of steamers from the city. I know nothing more concerning it.

Season of 1841.—Dr. Thomas Beaumont, who resided near the village, informs me that there were, this year, more than twenty well-marked cases. Goods were, as in every other autumn, landed daily, for the interior. On the 12th of October, before any case had occurred, a gentleman from the neighborhood rode through the town, and without dismounting, lingered in it about three-quarters of an hour. On the night of the 13th he was seized with the fever. On the 17th, a citizen of the place was attacked, and on the 19th and 20th many others. At the time the fever commenced here it had been epidemic for two and a half months in New Orleans, during which boats from that city had been stopping and landing goods at the village. In fact the epidemic had declined so far, that only 252 admissions had been asked at the Charity Hospital, in October, while the number for September was 642. During this invasion, about twenty persons went from the village to the town of Jackson, twelve miles from the river, and two of them were taken down with or labored under the fever when they started, but the people of Jackson remained unaffected. A man from the neighborhood, after visiting the place, was seized, and died with black vomit, but did not propagate it to his physician or family.

Season of 1843.—From Dr. B. I learn that the disease reappeared in 1843, but was rather sporadic. Prof. C. says, the place had daily communication with New Orleans. A man from the country contracted the disease, but did not communicate it to his family.

WATERLOO.

Season of 1839.—Like Port Hudson, Waterloo seems not to have been visited by the fever till this memorable autumn. The following is Dr. Monette's account:—*

"The commercial intercourse between this place and New Orleans was uninterrupted; and besides the usual steamboat communication, during the epidemic in the city, a number of the French inhabitants, believing they possessed a constitutional immunity against the disease, made a visit to New Orleans in the midst of the epidemic. After a few days of pleasure and dissipation in the city, they returned; and several of these were soon attacked with yellow fever, and died. An infected atmosphere was gene-

* Observations, p. 96.

rated, and several others, who were not exposed to any *other* source of infection, sickened and died. The whole number of deaths at this place was about fifteen. I derive this information from D. P. Cain, Esq."

I know nothing else of this or any other invasion. Waterloo has long been a landing-place for the rich settlements of Point Coupée, and its intercourse with New Orleans was the same, both before and after 1839, as in that year.

BAYOU SARA, AND ST. FRANCISVILLE.

SEASON OF 1811.—The earliest accounts I have been able to obtain of the fever at this place (for I shall speak of the towns as one), is from Judge Butler, who informs me that it prevailed this year, he himself experiencing an attack. It was epidemic that year in New Orleans and Pensacola.

SEASON OF 1817.—The fever did not prevail this year, but an occurrence happened which deserves to be recorded. Prof. Carpenter states it as follows:—

"In 1817, while the yellow fever was epidemic in New Orleans, Phillips' barge left the city for St. Francisville, and soon began to lose her passengers and hands. To replace the latter, new hands were continually engaged, who took the disease in succession, so that it was with great difficulty the voyage was performed; and finally, of the captain, crew, and passengers, not one survived. The owner of the barge, Mr. Stoker, who resided at St. Francisville, having visited her at the landing, paid the forfeit of his life for his imprudence."

Mr. Remondit, a respectable Creole of Bayou Sara, confirmed this account when I was in that place. He stated that Stoker went on board the barge to take off the pilot, who was dying of the fever. In thirty-six hours he was attacked, and died in four days, with deep yellow skin and black vomit. Others went on board, but remained a shorter time, and did not suffer. They found the barge excessively foul. There was no spread of the disease. These facts show that a river barge may, like a ship, have a yellow fever atmosphere, and that persons may die of that disease in autumn in a town without communicating it.

SEASONS OF 1819 AND 1823.—Major Marks and Mr. Remondit inform me that in each of these years, several travellers and voyagers stopped here, sickened with the fever, and died; but did not communicate the disease.

SEASON OF 1827.—Mr. Remondit and Major Marks assure me that the disease prevailed here in 1827. The first case was that of White, a carpenter, on the hill in St. Francisville, where the chief population then was. The second victim was Monro, who worked on the same building. The mortality was very considerable. Disputes arose as to the local cause; but no one suggested its importation. Mr. Long confirms this statement.

SEASON OF 1829.—The disease seems not to have occurred again till this

year, during which it had been epidemic eleven times in New Orleans. It now prevailed in five other places besides New Orleans. Both Dr. Monette and Prof. C. are silent respecting this invasion. Dr. J. M. Bell, who had lately arrived, experienced an attack. The first case was about the 22d of September, in the upper town. The patient had not been to New Orleans, but lived in a store that was frequently receiving goods from that city.

Major Marks and Mr. Remondit say that the patients in this epidemic generally died with cold extremities and without black vomit; but Dr. Slaughter, the principal physician, pronounced it yellow fever. Dr. Bell says one patient died with black vomit, and his own attack bestowed upon him immunity from the disease.

Season of 1839.—Nine years passed away without another invasion, notwithstanding the fever was five times epidemic in New Orleans, and this town was a landing-place for goods to supply the country fifty miles back!* This year the visitation proved severe and mortal. My principal informants are Mr. Ball, the post-master, Dr. Jones, and Dr. M'Kelvey. It was entirely confined to the lower town (Bayou Sara), although the intercourse, Dr. M'Kelvey informs me, was maintained between the two places. One person only had the disease in the upper town, and he came from the lower with it.

The first patient, according to Dr. Jones, was a traveller two or three days from Natchez, where the disease was epidemic. He sickened on the 28th of August and died on the 1st of September. No other cases immediately occurred in the family in which he lodged. The next patient, according to Mr. Ball, was Bantee, who had been in New Orleans about a week before. He died on the 10th of September. The next was M'Arthur, who had attended his funeral; and died on the 23d. During his illness several others were seized; among them was Harroldson, who lived a mile in the country. He attended the funeral and pronounced an address over the grave. He died in the midst of his family, but none of them suffered. On the 20th, Dr. Jones was called to a woman in the house in which the stranger had died. She had yellow fever, but recovered. On the 24th, and 29th, he had two cases in two different taverns. Dr. M'Kelvey's first case was that of a merchant, Collins, taken on the 24th. One of his clerks was seized on the 27th and another two or three days afterwards. About the 1st of October, according to Mr. Ball, a merchant, Mr. Baldwin, received goods from New Orleans. His two clerks, while yet engaged in opening them, sickened with the fever, and both died.

These facts certainly give strong support to the doctrine of introduction; though it is remarkable that the epidemic did not extend into the upper town, where, from its absence for nine years, there must have been subjects for it. It should not be forgotten that this was the season of more

* Dr. Monette, p. 98.

xtensive geographical prevalence than any other. Dr. Monette (p. 98), ives the following account of the origin of this epidemic.

"When yellow fever became epidemic in New Orleans, many persons came to Bayou Sara, and the vicinity, as a retreat from disease; others arrived at intervals subsequently; and the regular packets, besides the boats in the upper trade, continued their trips as usual during the epidemic, until many cases of yellow fever were introduced, as at other points. An infected district was produced near the steamboat landing, and the disease finally spread among the resident population."

All this is as true of any other year as of this. The cases I have cited were scattered over the town.

Season of 1843.—The epidemic of this year occurred in both lower and upper towns. Prof. Carpenter* gives the following account of the origin of the fever this season:—

"Many cases of yellow fever with black vomit occurred, and it was considered as of local origin. But a case of yellow fever was taken from Baton Rouge to Bayou Sara, and C. Ratliff, Esq., informed me that he saw a man from New Orleans who died at the hotel in St. Francisville before any of the citizens took the yellow fever, and the man threw up a great deal of black matter. The infectious nature of the fever, in these cases, was unquestionable, as the connection between the cases was perfectly obvious."

The important details of this paragraph led me when in this place to make a patient and searching inquiry.

Lower Town—Bayou Sara.—It appears that the first patient was Pierce, a watchmaker, two squares from the river, who died on the 8th of August. The second patient was Cosset, a merchant's clerk, on Front Street, who had been constantly receiving and opening goods. He was attacked on the 2d of September and died. The third was Davis, a stranger, who sickened on the 1st of October and recovered. The fourth was a shoemaker from Woodville, where the disease did not prevail, who was attacked soon after his arrival on the 2d, and died on the 6th with black vomit. The fifth was Rudi, a Creole tailor, who lodged not far from the river, sickened on the 2d, and died on the 10th. The sixth was Durell, a stranger, taken on the 4th and recovered. The seventh was Johns, a painter, who had lived in Baton Rouge; he passed through Bayou Sara, went back into the country, remained three or four days, returned sick on the 5th, and died on the 9th with black vomit. This was probably one of the cases referred to by Prof. Carpenter. The eighth was Portier, who went to Baton Rouge on a visit, sickened and died on the 11th. The ninth was his brother, who followed to nurse him, and died of the same disease on the 21st.

Such were the first nine, comprehending nearly all the cases in Bayou Sara, as I was able to make them out, by a comparison of dates furnished by

* Sketches, p. 30.

Dr. Jones, Dr. M'Kelvey, Dr. Gorham, Dr. Bell, and several gentlemen out of the profession. No two except the last were of the same family; they were scattered in locality, and it must be admitted that they lend but little support to the hypotheses of importation or contagion. It appears in an especial manner that the case (7th) from Baton Rouge, referred to by Prof. Carpenter, did not introduce the disease. Let us now turn to the

UPPER TOWN—ST. FRANCISVILLE.—As the information which Prof. Carpenter had received led him to regard the rise of the fever in this place as unquestionably dependent on contagion, and as several persons informed me that the man who is mentioned in the extract from his sketches did not die of that disease but of mania-a-potu, I was induced to make a patient and careful inquiry of Dr. M'Kelvey, Dr. Newman, and many respectable citizens, into the whole matter, the results of which I proceed to give:—

1. Stafford, the man referred to by him, was not intemperate, but actually died of yellow fever, closing with black vomit. He lay in the chamber of a coffee-house, and was attended by the keeper and another one, both of whom were familiar with the disease, one having had it and the other having an insusceptible constitution. He had visited New Orleans, and returned on the 5th of September. On the 9th he was taken ill and died on the 14th. Dr. Newman saw him when ejecting black vomit a few hours before death.

2. Lurty, had an office two doors from this coffee-house, and three days after the death of Stafford visited the bar-room, the smell of which he found offensive. On the 11th of October, 24 days afterwards, he sickened with yellow fever, but recovered.

3. Barclay, a merchant, lived one square from the coffee-house, and did not visit it. He spent a part of every day at a mill surrounded by swamps, in the valley of the Bayou Sara, two miles out of town. Was taken down on the 13th of October, and died with black vomit on the 17th.

4. Johnson, had an office next door to the coffee house, and sat up several nights with Lurty; sickened with the fever on the 19th or 20th of October, and died at his lodgings in the country, not communicating the disease to any of the family.

5. Dalton, had an office opposite Lurty's residence; sat up with him, and spent much of his time in his room; was taken with the fever on the 20th of October, and died on the 25th, with black vomit, at his lodgings in the country, not communicating the disease to any of the family.

6. Ivor, Dalton's partner, occupying the same office with him, and having intercourse with him while sick, was seized on the 26th, the day of Dalton's funeral, recovered.

7. Hyatt, had an office one square from Lurty's residence. Assisted in nursing Johnson, and was attacked after the 25th of October, on the day of Johnson's funeral; died on the 5th day with black vomit.

8. Dr. M'Kelvey, the physician who attended these patients, was taken down on the 2d of November and recovered.

9. Maynard, had Hyatt in his house, but did not visit him; seized 2d of November, but recovered.

10. Bains, a friend of Maynard, in the same house through the day, but not at night, was seized between the 10th and 15th of November, and died on the 8th day of his disease, with black vomit, and had post-mortem hemorrhage.

11. Flower, lived eight miles in the country, spent some time in Dalton's office after his death, and sat up one night with Bains, the next day after which he sickened and died with the fever in the country.

12. Smith, of the country, visited Johnson during his illness, sickened with the fever about the 2d of November, but recovered.

These were nearly all the cases which occurred. They included the sheriff, two officers of the bank, a merchant, and several lawyers, most of whom by their pursuits were kept in the upper town, and very few of them had much communication with the landing.

It is worthy of note that here, as in the lower town, all the patients were men, and that the disease was uncommonly fatal, seven out of the twelve having died.

On comparing the dates of the cases in the upper and lower towns, we find that although the fever began first in the latter, it proceeded nearly pari passu in the two places; apparently indicating an epidemic constitution of the atmosphere.

But what shall we say of the remarkable succession, and apparently derivative succession, of the cases in the upper town. If the disease really had been contagious, would it not have been likely to have acted precisely as it did? If it depended on the general condition of the atmosphere it is certainly very remarkable, that the succession of cases should have so exactly coincided with the demands of a contagious propagation. But if contagious, could Lurty, who visited the coffee-house three days after the burial of Stafford, have been infected there when he was not taken down till twenty-four days afterwards? Can it be admitted that the remote cause might have lain dormant in his system for that length of time; but then there was no evidence that Barclay had any communication with either the patient or the coffee-house people. If it be asked why, contagion being admitted, a greater number were not attacked, the question may be answered by asking why, if there were an epidemic constitution of the air, to which all were alike exposed, these only should have been selected? Of all the alleged instances of contagious propagation which the history of the disease has as yet presented us, this appears to me the best made out.

WOODVILLE.

Season of 1844.—Although persons from Bayou Sara and other places,

where yellow fever prevailed, had come to Woodville where they sickened and died with black vomit, no spread of the disease had ever followed in that town, which was in fact regarded as exempt, till the serious epidemic outbreak of 1844. From its isolated and interior position, the expectation was, I think, very general, that the history of this epidemic would throw much light on the origin of yellow fever; while it was still prevailing the Medico-Chirurgical Society of Louisiana sent a commission of two of its most respectable members, Drs. De Valetti and Logan, to inquire into the facts of the case. Their report* declares the disease to have been yellow fever, considerably modified in some of its symptoms. Of the circumstances of its origin they found it impracticable to acquire a full and accurate account, as the epidemic was still reigning; but Drs. Stone and Killpatrick, of Woodville, have since published circumstantial histories,† which although conflicting in some points, agree on the whole as closely as the narratives of the kind are generally found to accord. The former of these gentlemen has presented us with a tabular view of the cases which occurred during the first month, which was submitted to Dr. Killpatrick and other physicians, and pronounced correct, as far as their knowledge extended; subsequently, however, Dr. Killpatrick, as he informs us, gained more exact information on some points, and presents it in his paper. I have examined it with care, and endeavored to apply it with impartiality to the statement of Dr. Stone.

Both the gentlemen concur in this, that the Rev. Wm. Thurber, of Texas, who on his way passed the first five days of July in the town of Galveston, when feeling somewhat indisposed he spent the next three on the island, out of town, where he recovered. On the 6th, 7th, and 8th, he heard of persons taken sick, but did not learn that they had yellow fever; on the 9th he embarked for New Orleans, and arrived at Col. Lewis's, on the south-east edge of Woodville, on the 12th. Before retiring, on the night of the 15th, from having indulged freely in fruit, he was induced to take a dose of cathartic pills. About 3 o'clock the next morning he felt ill, and that illness proved to be an attack of what both the gentlemen and Dr. Brown, the attending physician, agree to regard as yellow fever. On the 1st of August he was so well as to leave Woodville. It seems to be agreed on all sides that if this case did not introduce the yellow fever, it originated in the town. Let us now turn our attention to Dr. Stone's tabular view.

July 16th. Rev. Mr. Thurber, of Texas, at Col. Lewis's, attended by Dr. Brown. Taken at 3 A.M. Recovered.

Mr. Collins, living 400 yards north, visited Col. Lewis's in the afternoon of the day before, and spent half an hour with him in a porch outside of the house; did not see Mr. Thurber. Dr. Killpatrick, who was his physician, after approving this date, came to the conclusion that this visit was not made the day before, but the afternoon of the day on which Mr. Thur-

* New Orleans Medical Journal, vol. i. p. 237.
† Ibid. vol. i. p. 530, vol. ii. p. 49, and p. 196.

ber was taken, at three in the morning. To my own mind the testimony adduced goes to support the first statement.

But the difference between coming to without entering the house fifteen hours before or fifteen hours after Thurber's attack, cannot, I think, be admitted to be of much moment. If there was a contagious emanation of such virulence in the first day of his attack, as to produce the fever in a single day in Collins, who did not enter the house, how could it happen that the family, black and white, as well as the nurses, should escape as they did, till the 31st of July and 1st of August, more than two weeks afterwards, and then have attacks so mild, that no physician was called in. Two ladies, moreover, who resided in the family and one who visited them frequently were not seized till the 15th, 17th, and 19th of August, by which time more than thirty cases had occurred in town, of which two had proved fatal. It does not appear that those who watched over Collins took the disease, for no mention is made of any such case, except a servant woman, hired out, who was said to have visited him, which however was denied. Her case will be mentioned presently. Thus if Collins did take the fever from Thurber he did not communicate it to the town.

19th. Mr. Shaw, a stranger, had come from Bayou Sara in company with Mr. Thurber, but lodged in a remote chamber of Mr. Thirrell's boarding-house, 400 yards off, to the north. Said to have visited Mr. Thurber on the first or second days of his illness, but that gentleman, on the 17th, the second day, said not.

22d. A negro child at Lancaster's, 500 yards northwest of Lewis's, and not in the neighborhood in which either of the other patients was sick. Attended by Dr. Holt.

24th. A negro child at Col. Gorden's, 200 yards north of Col. Lewis's, and not near any of the other patients. Attended by Dr. Martin.

27th. Maria Ivor, a child, 100 yards north of Collins and Shaw. Attended by Dr. Stone.

31st. Col. Lewis's children, in the same house with Mr. Thurber. Attacked two weeks after him. No physician.

August 1st. Mr. Thurber's two black nurses, servants of Col. Lewis. No physician.

Mrs. Gorden, whose negro child was taken on the 24th of July. Had not visited Col. Lewis's. Attended by Dr. Martin.

A negro woman of Mr. Collins, living with Judge Gildart, in the extreme northwest part of the town, but visited her master, it is said, on the fifth day of his illness, that is on the 21st of July, and remained for some time in his room; but this is denied by Mrs. Gildart. Attended by Dr. Killpatrick.

2d. Mrs. Simrall, thirty yards south of Col. Lewis's. Had visited at Mr. Lewis's, but not Mr. Thurber's room. Attended by Dr. Stone.

4th. A second negro child at Mr. Lancaster's. Attended by Dr. Stone.

5th. Mr. Smith, at Thirrell's boarding-house, where Mr. Shaw sickened on the 19th. It is not stated that he had visited Mr. Shaw. Attended by Dr. Holt.

6th. Mrs. Col. Lewis, supposed to have had the yellow fever at Fort Adams, in 1839; as late as the 23d of July, nine days after Mr. Thurber's attack, and two days before he left his room; but had prescribed for her servants, taken sick on the 1st of August. No physician.

7th. Two negroes of Mr. Simrall. One had been at Col. Lewis's frequently during Mr. Thurber's illness; the other probably not once. Attended by Dr. Stone.

10th. Mr. E. Keller, returned from the country a week before; not stated whether he visited any one with the fever. Attended by Dr. Brown.

11th. Mr. Simrall and child; Mrs. Simrall and two negroes had had the fever. Attended by Dr. Stone.

12th. Mrs. Slade; not stated that she had visited any one of the houses in which the fever was; lived in the vicinity of Thirrell's boarding-house, where Mrs. Shaw was taken on the 19th of July.

Mr. Gillespie, at Col. Lewis's. Attended by Dr. Brown.

13th. Mr. Posey, in the same neighborhood. Not stated whether he had visited any of the sick.

Mr. John M'Kee, remote; his exposures not stated.

Dr. Stone's servant, a week from the country.

Before this last day, says Dr. Stone, cases were occurring in various parts of the town in great numbers. The inmates of the jail, however, remained unaffected throughout the whole season, but every member of the family of the jailer, living in the rooms below the prisoners, was attacked, and he himself came near dying.

I must devote a paragraph to the country: "There were," says Dr. Killpatrick, "numerous instances of persons coming into town and remaining a short time, who were very sick in a few days in the country; some in fact who passed through the town with very short delay, were nevertheless attacked." Dr. Stone says: "A hundred or more cases occurred in various parts of the country in persons who visited Woodville during the epidemic." Let us inquire into the consequences to the country population of this dispersion of cases.

Moses, a negro man belonging to Mrs. Newell, five miles in the country, was frequently in town, and at Mr. Simrall's during the illness of his wife, which commenced on the 2d of August. He died of the fever, on the plantation, on the 13th of that month. The other negroes continued healthy, and between the 7th and 20th of that month, ten of them, on various occasions, had been sent into town. The others were taken while in town, and passed through the fever at Simrall's. On the 28th of August, two weeks after the death of Moses, the fever appeared among the negroes who had not been (or had not been known to be) in town, and the first six cases

were of that class; it then fell upon the other class, and affected both indiscriminately. The mother of Moses, however, who nursed him, was the last taken down, nearly nine weeks after his death.

Judge Walker, six miles in the country, contracted the fever in Woodville, and died at home on the 11th of September. One of his servants was in Woodville on the 11th of August, and had the fever on the 5th of October; another who was in the town on the 5th of September, and also nursed his master, was attacked on the 20th of August.

Morris lived two miles from Woodville. Several of his servants had been in town and suffered from the fever, which was limited to them.

Holt lived ten miles from town. Four of his servants who had been there experienced attacks three and four weeks afterwards.

On Burrass's plantation, late in the fall, there was a case in an individual believed not to have been in town.

On Trask's plantation, seven miles out, a negro was attacked on the 4th of September, who it was positively asserted had not been in Woodville since the preceding December. Of course there may have been error in both these cases, as the negroes might have gone and returned in the night.

Many persons left Woodville for Natchez and Bayou Sara, during the epidemic; of whom not a few sickened by the way, and after reaching Natchez, but did not communicate the disease.

On the plantations of Brandon and Keary, fifteen miles from Woodville, there were fevers of a single long paroxysm, unlike the ordinary intermittents of the season, and others were observed on different farms in the country. Dr. Powell, of Pincheyville, saw many cases of this kind, and among them two cases contracted in Woodville, and could observe no difference in the symptoms. These and the generality of the cases of the fever over the country, as in the town, did not admit of the use of the sulphate of quinine, the specific in ordinary years.

Such are the most important facts bearing on the origin of this epidemic, as furnished by its historians. Let us by their aid attempt to answer this question.

Did Thurber, from Texas, give the fever to Woodville, or did it give the disease to him.

1. We have already seen that the attempt to fix on Collins and Shaw as the persons through whom he spread it, has been unsuccessful; for, in the first place, the former could not have contracted the disease from him, and did not communicate it; and in the second place, if the latter did contract the fever from him, which may be questioned, he did not propagate it.

2. Those who might have been infected from him, if his disease were communicable, were not affected before, but simultaneously with or after several others.

3. Many who visited and nursed others, as Shaw and Collins, were not taken down till after the fever had become generally prevalent.

4. As Thurber was sick on the edge of the town, if the disease could spread from him there seems to be no reason why it should not have spread in the country from those who took it by visiting Woodville, and certainly none why it should not have been introduced into Bayou Sara and Natchez.

5. Yellow fever generally begins in July and increases till September, when it prevails most, and ceases in November. This epidemic followed the same course, and the arrival of Mr. Thurber and Mr. Shaw on the 12th of that month might have been an accidental coincidence. That, as strangers to that atmosphere, they would have been highly susceptible, will be granted by the whole profession, and that they had been there long enough to be acted upon by it, if a poison floated in it, will be admitted by those who insist that Collins had the disease from Thurber in fifteen hours after a visit to the outside of the house, and that Shaw had the fever in one or two days after an alleged visit to the patient.

6. It appears that the negroes of Mrs. Newell, eight miles in the country, had the fever without having visited Woodville, but it also appears that over the country generally, there was an epidemic constitution similar to that over the town.

On the whole then, I am driven to the conclusion, from the facts which have as yet been made public, that Thurber did not introduce the disease, and that if he did, there are other facts which have not yet been brought to light. If it be asked, what then was the origin of the fever, I answer that this is a totally distinct question, on which I do not propose, at this time, at least, to enter.

TOWN OF FORT ADAMS.

SEASON OF 1839.—Notwithstanding so many places, both below and above this place, had been so often affected with yellow fever, it does not appear to have occurred here till the great epidemic season of 1839. According to Dr. Monette it was introduced in the same way as into the other towns below; I suppose by the arrival of boats from New Orleans, and the landing of passengers and goods for the interior; operations which had taken place annually for many years before. They *may* have introduced the fever this year and not previously; but to say they *did* is to assume what the facts should prove: these he has not given us. It is worthy of remark that this was then, as it had long been, a principal landing-place for the town of Woodville, from which we have just passed, and which seems to have been as free from the fever in 1839, as Fort Adams was in 1844. Such facts involve the ætiology of the disease in great mystery.

NATCHEZ.

SEASONS ANTECEDENT TO 1817—During the period now under considera-

tion, yellow fever was epidemic seven times in New Orleans, without occurring, as far as can be now known, in the town of Natchez. Dr. Lattimore came to the place in 1800, when he could not learn that the disease had ever prevailed. Nevertheless, it has been supposed that Mr. Elliott saw it there in the summer of 1797;* but a careful examination of what he wrote, has convinced me that the disease was but the endemic autumnal fever of the Southwest. At various times, however, the physicians of Natchez saw cases of yellow fever from New Orleans, of which the autumn of 1804 furnished the most memorable examples. Dr. Perlee† informs us that he was assured that a barge arrived with nearly all its crew, amounting to thirty, ill with yellow fever. They were landed and brought into town, where all the sick except two died, none of the attendants or residents of the place being attacked. This account was confirmed to me, in 1844, by Dr. Lattimore, who was at the time a physician of Natchez. During this period of time the internal condition of the town appears to have been nearly the same as it was in the

Season of 1817.—This year the fever prevailed as an epidemic. As to the topographical condition of the place, the only difference between this and the preceding years, seems to have been that of considerable grading of the streets, commenced, as Dr. Lattimore informed me, in this or the latter part of the preceding year, whereby much new earth was exposed to the action of the sun and rains. The latter were more equably distributed through the three summer months than usual, and the aggregate 12·33 inches was less than the average of nine years, of which it was one, by ·64 of an inch. It might in fact be called a dry summer rather than a wet one. As to heat, the mean temperature, 77·76°, was only ·24 above the mean of the preceding seven summers, while it was less than three of them, and nearly 3°, below that of the summer of 1816.

Such was the condition of the town as far as Dr. Perlee, the historian of this epidemic, could make it out on emigrating thither subsequently.‡ As early as August, occasional cases of yellow fever were seen in town, but where they were contracted, Dr. Monette§ could not learn. Dr. Perlee has not mentioned these cases, but as Dr. Monette is a believer in importation, we may presume that he has satisfied himself of their occurrence. In the beginning of September, the steamboat Washington arrived at the landing from New Orleans, where the fever was then epidemic, with persons on board ill with yellow fever, some of whom were landed. Several young men of the town went on board, who were all taken sick soon after and died. The disease spread rapidly over the city and displayed a character of great malignity. It was suddenly checked by a severe frost on the 9th of November.

Dr. Monette and Prof. Carpenter have attributed this epidemic to the

* Journal, p. 288. † Phila. Jour. vol. iii. p. 5. ‡ Observations, p. 62.
§ Phila. Jour. vol. iii. p. 17. Observations by Geo. Sargent, attached to Dr. Perlee's paper.

Washington, but as cases had occurred in August, and she arrived early in September, when in all places where it occurs yellow fever is rapidly spreading, we may *suppose* the coincidence accidental, but it is universally admitted that the atmosphere of a boat or ship may be like that of a city or the portion of a city whose atmosphere will produce the disease, and therefore the atmosphere of Natchez, and of the boat, were both contaminated with the same poison, but the latter more deeply than the former. Thus on going on board the young men got their systems additionally impressed by the remote cause. The true question is whether the atmosphere of the boat could have produced its like in the atmosphere of the town, not whether it could poison those who came on board; and also, whether those who were thus poisoned, could poison others. If they could, they would spread the disease. If they could not, they could not spread the disease.

It does not appear that cases of the fever in town were traced up to cases generated on the boat; and therefore its importation was not made out even admitting that it was imported. I mean that as it existed in the city before the boat arrived, and it was not shown that the arrival was the *cause* of the subsequent increase, a case of importation is not on logical rules made out. Cases of the fever were imported—and a quantity of the cause was imported, which produced other cases in those who exposed themselves to it, which is all that we know. The data necessary to any other conclusion are wanting. The alarm of the young men on discovering the unhealthy condition of the boat, may have acted as an exciting cause to the disease; to which, as it had already begun, they, in common with the other inhabitants of Natchez, were predisposed. The next year was exempt from the fever; and was distinguished as being the first year of quarantine. The fever prevailed this year in New Orleans.

Season of 1819.—The summer of this year had a mean temperature of 78·66°, which was 1·03° higher than the mean of the nine preceding years, but it was less by 2·25° than the mean of three years just before, when the fever did not prevail—less by 3·03° than one of those years. It is impossible, then, to admit the agency of great comparative heat in the production of this epidemic. But the rains of this summer were great—more copious than those of the preceding nine, except 1812. They amounted to 23·43 inches; or 10·26 inches more than the mean of the preceding nine years; they came within 1·56 inch of the year 1812, and rose above 1813, 3·04 inches; finally, they exceeded the rains of 1817, 11·11 inches—that is were nearly double. Shall we then admit the influence of these copious rains in the production of the fever of this year? We cannot, because in the summer of 1813 nearly as much fell, in 1812 a greater quantity, and in neither year was there any fever; still further, the fever prevailed in 1817, when the quantity of rain was little more than half that of 1819. It is impossible to grant that great dryness, and great moisture in the same locality, so

near the same time, can produce the same effects. It must be admitted, however, that if the rains fell at any time so copiously as to produce an inundation, sinister effects upon health might result from that cause, and this Dr. Perlee tells us was the case in July, when the quantity was nearly eleven inches, which inundated hundreds of acres of land in the valley of Catharine's Creek, drowned many animals, and left a covering of slime which emitted an offensive smell. But in 1812, there fell in that month 9·11 inches of rain, and we may presume a similar overflow occurred, yet no yellow fever followed; however, the temperature of August this year was 79°, while that of August, 1812, was only 76°. Shall we ascribe the production of the fever to the additional 3° of heat? Finally, in 1817 there was an epidemic, in the absence of great rain and also of great heat, as that of the month of August was only 77°.

As soon as it was known that the fever had begun in New Orleans this year, the authorities of New Orleans established a quarantine and *cordon sanitaire*, about the middle of July, which Dr. Tooley tells me were rigidly enforced; notwithstanding which the epidemic began on the 1st day of September with several cases at the upper end of Main Street, near a pond. On the 2d, Dr. Perlee saw four others, who worked in one shop in the same locality; on the 4th, a man died with black vomit in the Natchez coffee-house. On the 4th also, Dr. Tooley saw a case near the east end of the town, remote from the river. The Board of Health now announced the existence of the fever, and the greater part of the population fled to the country. It does not appear that any boat having yellow fever patients on board landed at the wharf, but the Alabama, with cases of that kind, stopped on the 28th of August at the village of Vidalia, opposite to Natchez. According to Dr. Perlee's statement, which is not questioned by Dr. Monette, no one came from her to the city. Many of the refugees took lodgings in Washington, but as I was assured when there, none of its inhabitants had the fever. This epidemic, which was very mortal, did not finally cease till the 1st of December.

Dr. Monette speaks of this epidemic in language which implies that it was imported, and Prof. Carpenter, quoting him as authority, says, "Introduced from New Orleans." Still Dr. Tooley, who was then in its midst, assures me that the contagionists were silent, and that no one even suggested its importation. This autumn the fever prevailed in many places.

The years 1820, '21, and '22 were exempt; yet Dr. Monette is persuaded that sporadic cases occurred from opening goods from New Orleans. Why it did not spread he does not explain. In 1820 and 1822 it prevailed in that city, and in the latter of these years at many other places. In the two years in which it was in New Orleans, the quarantine at Natchez was enforced; and might have been regarded as the cause of its absence from Natchez, but for its invasion the next year, while the quarantine was still in existence.

SEASON OF 1823.—The epidemic of this year was the most fatal that has ever visited Natchez. Its historians are Drs. Tooley,* Merrill,† and Dr. Cartwright.‡

1. As to the weather before the setting in of the epidemic, Dr. Tooley, long the meteorologist of that city, informs us that the spring months were moderate as to wet and heat and presented nothing unusual. From the middle of July to the middle of August the weather was dry and sultry; the mean heat was 87°. From the last week in July to the 24th of August, the winds varied from southwest to west, blowing briskly in the day and moderately at night, with heavy dews. According to Dr. Merrill, the months of April, May, and June brought forth many deluging rains. About the 1st of July the weather became suddenly very dry and warm, the thermometer ranging from 80° to 93°; which weather continued with little variation to the 25th of August, beyond which we need not extend the account, as the fever had already set in. From Dr. Cartwright we learn that the atmosphere of spring and early summer was unusually damp.

2. An extraordinary flood in the Mississippi inundated the wide bottom lands of Louisiana, opposite and below Natchez; but as the fever did not occur, and such floods are common there, it is unnecessary to say more of that.

3. Dr. Merrill ascribes the fever to the grading of the streets, which, as we have seen, was begun in 1816, but does not tell us that it had been going on in the winter or spring preceding this epidemic.

4. Dr. Tooley dwells on the deposit of carcasses on a terrace of the bluff below the city, to which reference has been already made; but this had been practised for years before, and there is no evidence that the quantity this year was greater than usual.

5. Dr. Cartwright, after recognising this infected spot, speaks also of a large pile of putrid oysters in the western edge of the town; and of a house in the southern part which contained a considerable part of a flat-boat load of bacon, pickled pork, and fish, nearly all of which in the month of July were in a state of putrefaction. Dr. Tooley recognises the same fact, Dr. Merrill admits it, and the city council have certified to the general accuracy of Dr. Cartwright's statement; and still Dr. Monette§ was assured by Col. Fleming Wood, the alleged proprietor of the bacon, that the information on that subject was entirely erroneous, and that no such lot of bacon was in the city; such is the discrepancy of yellow fever history.

6. All the historians of this epidemic, as well as the sexton, whose register I examined, concur in this, that the first cases of the fever appeared in houses remote from the river, and that the people of Natchez-under-the-hill remained free from it for a fortnight after several well-marked cases had

* History of the Yellow Fever as it appeared in Natchez in 1823.
† Phil. Jour. Med. and Phys. Sci. vol. ix. p. 225. ‡ Med. Record, vol. ix. p. 1.
§ Observations, p. 66.

ed in the upper-town. In short there seems to have been no suggestion having been brought from New Orleans. It appears, moreover, that was this year a quarantine against boats from that city, but Dr. Monette) declares it was not well observed; nevertheless he does not attempt e up the epidemic to its violation.

Dr. Cartwright has given us the following important observation, is however by implication partially contradicted by Dr. Merrill. "In nd July the common bilious fever of the country prevailed in the city, ere were but few deaths. At length the progress of the bilious fever *ddenly arrested*, and nothing but the Lichen tropicus or prickly heat bed the health of the citizens. About this time the cats took a dis-r, of which many died. From the 1st to the 9th of August, excepting ild, there was not a death in the city."

It is worthy of remembrance that during the season of this mortal ion no other town in the valley of the Mississippi experienced an attack; though Prof. Carpenter speaks of the disease as having been introduced New Orleans, it will be seen by reference to its history in that city for that it was scarcely if at all sporadic there, and that of the two cases nced into the Charity Hospital one was two, and the other four weeks he epidemic of Natchez commenced.

come now to the outbreak of the epidemic, but instead of giving the ase cited by Dr. Cartwright and Dr. Merrill, the verity of history re-that I should follow a suggestion of Dr. Tooley, who says of a person lied on the 24th of July, that the attending physician reported the e as pneumonia, but that from various circumstances and symptoms, is reason to believe that this lady died of sporadic yellow fever. Her , as Dr. Tooley and the sexton informed me, was Howard. After exton, who was well acquainted with yellow fever corpses, saw the , he told Dr. Provan, the physician, that the patient must have had w fever, on which that gentleman remarked, "If you talk so you will ten the people away." Now this lady, who lived near the house in which the putrid bacon, around which the first cases reported by Dr. Cart-ht occurred, had been on a visit to the Eastern States, and returning by touched, it was said, at Havana. How long she had been back before attack, neither the sexton nor Dr. M'Pheters, nor any others with whom nversed, could after the lapse of more than twenty years make out, but the on said it was not a long period. We do not know what length of time elapse after the system has become impressed by the cause of yellow r, before the disease shows itself; but its history at Woodville presents s of the disease in the country three and four weeks after visiting the a; and intermittent fever, from which we may borrow an analogy, often ars for the first time, several months after exposure to its remote cause. it not possible then that this lady returned home with the semina of the ase in her system, from landing at Havana, or from the atmosphere of

the ship? If this were the fact it would not prove that the other cases which occurred almost immediately afterwards in the same neighborhood were produced by hers; it would not *establish* the contagiouness of yellow fever, nor the importation of fomites in her baggage; but *admitting* the transmissibility of the disease, it might explain perhaps the outbreak of this epidemic.

We come now to Dr. Cartwright and Dr. Tooley's statement of the first cases.

On the 9th of August Mrs. Wynn died, in the very house in which was the spoiled bacon; on the 11th, Mrs. Van Campen died in the same house, both with black vomit; on the same day a young lady, Miss Blake, who had frequently visited the house, died in a distant part of the city; on the same day Judge M'Caleb, from the country, dined there, sickened on the 15th, and died on the 18th; on the 13th, Mr. Sill, who lived hard by, fell a victim to the same disease; on the 16th, Mr. M'Guire, living at Mr. Sill's, died; and on the 22d, Mrs. M'Guire; finally, by this time four or five others in the same neighborhood had become the victims of the disease, while other parts of the city remained exempt. The disease now began to manifest itself over the city generally, but was most prevalent in the southern portions where it first appeared.

In fact it seemed to extend into the edge of the adjoining country to the south almost as fast as it advanced north through the city; so that ultimately, according to Dr. Cartwright, there were few families within a mile that escaped it. One of these patients declared that he had not been in town for some months.

As the disease began to prevail, a great part of the population fled to the country, where many of them sickened and died, but Dr. Cartwright did not hear of a single case of propagation of the disease.

A large portion of the fugitives sought an asylum in the town of Washington, six miles to the east, where they sickened and died in large numbers; but not a citizen of that place, according to Dr. Cartwright, took the disease, except he had visited Natchez. When I was in Washington I assured myself, by a rigid inquiry, of the truth of this remarkable fact, the more remarkable because the town was crowded to overflowing. But the case was different at a *quasi* village, on the road to Washington and five miles from Natches, called Coonsville. There happened to be at this spot some unoccupied cabins, and a number of temporary sheds were put up. Into these about sixty persons of the poorer class were crowded, bringing with them all their movables. Many of these, according to Dr. Monette,* sickened and died of the fever: and in addition, five persons who visited the place and had not, it was said, been exposed in any other way, sickened and died. When in Washington, a respectable lady, the daughter of the proprietor of the Coonsville plantation, confirmed this statement, and added to the number reported by Dr. Monette. Another reputable lady bore witness to the

* Observations, p. 65.

th of this statement; Dr. Branch of Washington testifies to the same. Cartwright is as silent respecting it as Dr. Monette is concerning the munity of the people of Washington, which Dr. Cartwright presents so minently. One believes in the foreign, the other in the domestic origin the fever.

There was no fever in 1824; it was however moderately epidemic in New leans. The quarantine was still continued, and enforced in the following r, though not, as Dr. Monette informs us, in the manner that was neces- y to render it efficient. The advocates of local origin are bound to mit that the quarantine may exist in name and form, but not in fact.

SEASON OF 1825.—This year there were great rains in March and April, t they diminished to September, when the amount was little more than inch. The whole quantity in June, July, August, and September, ording to Dr. Merrill, was only 12·74 inches, amounting to only half the antity which fell in 1819, when the fever was likewise epidemic. The an temperature of July, August, and September of this year, three miles the country, according to the same writer was 78 66°, or about one degree ve the mean common in the city; according to Dr. Cartwright, in the ernoon (for his table does not admit of a comparison of the morning observa- ns): it was, for July, 91·50° in 1824; and for the same month in 1825, 86°; t in August of the former, it was only 87°, while for the latter it was 91°; September, 81·75° in one year, and 83° in the other. Thus, while July s hotter in 1824 than in 1825, by 4·5°, August was cooler by 4°, and ptember by 1·75°. The heat and dryness of August and September, in t, were beyond; the temperature, according to Dr. Merrill, was 78·66°, or above the usual average; it also appears that the heat of July and gust was *equal;* but according to Dr. Cartwright's table, August was 5° tter than July. It is difficult for history to reconcile these discrepancies. The three historians of this epidemic have assigned three causes for it, ch having full confidence in his theory of its origin. They all agree as the place and time of the first cases,—at the landing in "Natchez-under- e-hill"—where the first patient died on the 21st of August, with black vomit, ter a few days' illness. Other cases rapidly succeeded, till ten had died t of a very limited population, but the town above remained unaffected, cording to Drs. Merrill and Cartwright, for the next six weeks.

Occurring at the wharves in a mercantile house, and the yellow fever vailing in New Orleans at the time, Dr. Monette, rejecting the causes signed by the two others as harmless, is convinced, that, notwithstanding the arantine, it was imported from that city. He does not, however, desig- te any particular boat. Dr. Merrill informs us that the first wharf had en constructed in the preceding spring, and that a great deal of loose earth d been dug from the adjoining bluff, and used in forming it; and to the halations from this, under the action of sun and rain, he ascribed the oduction of the disease; declaring the theory of nuisances "wholly unsa-

tisfactory," and asserting that no new accumulations had taken place. He does not even refer to importation. Dr. Cartwright, treating that theory and the fresh earth theory of Dr. Merrill with equal silence, directs our attention to the nuisances accumulated on and about the landing, as sufficient to account for the epidemic which began in their midst. These consisted chiefly of spoiled porter, sour pork, putrid sauerkraut, fish, oysters, a boat of rotten corn, and the slime of the river beach upon the subsidence of the waters.

As to the cases which subsequently occurred in the town, Dr. Monette derives them from the patients who escaped, or were taken from the landing, but cites no special examples; while Dr. Cartwright and Dr. Merrill concur in declaring that none could be cited. The former of these gentlemen found the origin of the disease in the continued exhalations from the earth thrown up and spread abroad in grading the streets, and levelling the lots between them. Lastly, the latter gentleman has pointed out three special localities of filth within the city, and one without its limits, where he assures us nearly all the cases on the hill occurred. It does not appear, however, that they had been created immediately before the epidemic, but had existed in the previous year, when the disease was absent, and in the year before that, when, although epidemic, it did not particularly affect those localities. Thus, each of these theories is embarrassed by the fact that the fever had been absent, when, according to its requirements, it should have been epidemic.

On the 30th and 31st of August, Dr. M. informs us, although the fever had not yet originated in the upper town, a large portion of its inhabitants fled to the country and to the villages. Two died at Coonsville, one at Kingston, and one at Fort Adams; but according to Dr. C. there was no spread of the disease at either place. But the chief asylum was

WASHINGTON.

It has been already stated that this village had been the resort of the people of Natchez during the epidemics of 1817, 1819, and 1823, many of whom had died in the midst of its hospitable families, without, in any instance, communicating the disease. Nevertheless yellow fever was not entirely unknown at Washington, for Dr. Branch assured me that in 1821, when Natchez was entirely exempt, he saw several cases, some of which were attended with hemorrhage and black vomit; and Dr. Monette* declares that he has "occasionally seen sporadic cases of yellow fever in the vicinity of Washington" when there was no epidemic in Natchez.

This year, 1825, presented a sad reverse of 1817, 1819, and 1823, for although free from the fever till after the people of Natchez crowded into it, to actual overflowing, as some lived in tents, the disease soon became mortally epidemic among the resident population, affecting them, indeed, so much more than it did the refugees from Natchez, that many of the latter at length returned to the city. This outbreak of the disease under circum-

*Essay, p. 70.

stances apparently the same as those of the three preceding years when it did not occur, cannot but be regarded as a remarkable phenomenon. Only two years before, while this place, although crowded, remained exempt, Coonsville, but a mile from it, and under the same topographical circumstances, was afflicted; but now, in turn, remained exempt, although a place of resort not less than Washington. If the want of susceptible subjects at Coonsville this year will explain the immunity, a similar explanation will not apply to the people of Washington two years before. Dr. Monette, whose residence is in this town, and Dr. Cartwright, who followed the fugitives to it, are the historians of this extraordinary epidemic, and both very justly concur in the opinion that it could not be ascribed to anything in the topographical condition of the place, for it is in fact an open village of about one hundred houses, on high, dry, and rolling land. Nor can it be ascribed to a disturbed state of the soil from excavations, for none had been made. Its historians, however, were not slow in satisfying themselves as to its origin, but fixed on very different sources.

1. According to Dr. Monette, in the previous epidemics of Natchez, Washington "had been the retreat of the merchants, mechanics, and others who wished to continue their trade with the country," and who had of course brought their goods with them; they had, moreover, not retreated from Natchez till after the fever had become epidemic, but this year they left it before a single case had occurred away from the river, and in their goods and household effects brought, as Dr. Monette conceives, the fomites which infected the people of Washington as well as the patients who secreted contagion; still further he informs us that several bales of blankets, direct from New Orleans, where the fever was epidemic, were opened, and that the first citizens of Washington who were attacked were persons engaged in opening these blankets. Of these victims the one most spoken of was Mrs. Carothers, but she died on the 27th of September, in the week previous to which eleven inhabitants of Washington had died of the fever in various parts of the village, and consequently she might have contracted the disease from the same cause with them. Indeed Dr. Monette informs us that by the 18th it was epidemic; and Dr. Branch, who was her physician, assured me that at the time she was taken it was prevailing throughout the village. Such is his theory of its origin.

Now the question may be asked, why a state of things identical with this did not produce the fever in 1817, 1819, or 1823? If an alleged cause failed three times out of four to produce the effect, are we at liberty to admit its reality in the fourth? As to direct propagation of the disease from citizens of Natchez, who sickened with it, to the people of Washington, I was told by its oldest physician, Dr. Branch, and many intelligent citizens, that they had not known a *single* case; and indeed Dr. Monette does not cite any; but appears to rely on fomites; but whence came the fomites if not from the bodies of those laboring under the fever, emanating as morbid secretions?

but the people of Natchez when they fled to Washington had not yet been affected with the fever, for it had not appeared except at the landing.

2. Dr. Cartwright, from personal observation and inquiry on the spot at the time of the fever, found an adequate cause in two nuisances,—a ravine and a grocery, which were contiguous to each other and in the centre of the village. He does not seem, however, to lay much stress on the former, which is indeed a gentle declivity terminating in a gully of such rapid descent that nuisances cannot accumulate in it, and which merely serves as a drain for the rains that fall on two squares of the village, and never has any other water flowing in it. The grocery contained the stock in trade of a citizen of Natchez-under-the-hill. At what time he transferred himself to the centre of Washington does not appear, but it was, as Dr. Cartwright informs us, in the latter part of summer. This grocery was said to contain about 2000 pounds of putrescent bacon, and two or three barrels of salted mackerel in the same condition. Before the fever broke out the bacon was removed, but the mackerel remained; and the lot in the rear of the store was made the receptacle of offal from Mississippi fish, which the grocer was in the habit of receiving. These, according to Dr. Cartwright, were the sources of the fever in Washington. As bearing on this point he has aggregated a mass of testimony concerning the stench emitted from this house, which is too long for insertion here. But as to its extent and intensity there are conflicting statements, for in 1844, Dr. Branch, whose office was opposite the grocery, and Mr. Rabb and Mr. Newman assured me, that they had not perceived it, and did not even hear it spoken of at the time when the fever was prevalent. If moreover it were so putrescent as to generate a fever, why was it kept for sale, and how could it have been disposed of in a single night, as Dr. Cartwright was told it was, in such manner that it was never afterwards seen? That some portions of it might have spoiled, and not the whole, must be admitted. Dr. Cartwright has also given a long catalogue of the first and subsequent cases with their localities, showing that the disease prevailed most among those most exposed to this alleged source. Admitting the general correctness of this statement, two obvious remarks may be made upon it. First, cases of the disease occurred in distant parts of the village nearly as soon as at the centre, and that too in persons who had not been in the neighborhood of the grocery, while others who had, escaped. Thus the police officer who went to the store to look after the bacon escaped, but his wife, as she informed me, who lived more than a square from it, and did not visit it, was seized in four days after the first patient, that is, on the 19th. In her conversation with me she could recollect fifteen of her acquaintances, scattered over the village, who were taken down within one day of herself; a recollection which coincides with Dr. Cartwright's statement, that "between the 18th and 25th the disease sprung up in *various* parts of the town and its *suburbs*." Now, as Dr. Cartwright

states the first case to have occurred on the 15th, we see it was less than a week before all parts of the town were affected.

2. The number occurring around it was not greater in proportion to the density of population than in the other parts of the village. They were numerous because the people among whom they occurred were numerous.

3. Dr. Cartwright informs us, that it was a few days before the fever commenced (on the 15th of September), that the police officer went to examine into the fact of there being putrid bacon in the grocery, and found it was gone. The alleged cause of the disease was removed, then, even before the fever broke out on the 15th; and the grocer, Dr. Cartwright informs us, returned to Natchez before the end of the month. Now between the 20th, when the first death (Miss Patrick, in the west suburb of the village) occurred (according to the statement of Col. Marshalk), and the end of the month, there were seventeen deaths; in the ensuing month, October, there were seventeen more, and in November, up to the middle, eight. Can it be admitted that these individuals were all empoisoned previously to the 15th of September, and that the fever was developed in their systems in the progressive manner indicated by this chronology? Such a rise and reign are in exact accordance with the general history of the disease, and not conformable, it seems to me, with the simultaneous impress of the system by a noxious exhalation, withdrawn from the whole at the same time.

I am compelled, therefore, to conclude, that the origin of the fever in Washington is not shown to be from this nuisance.

If I have dwelt on this subject it is because the outbreak of the fever in such a detached village seemed to afford extraordinary facilities for arriving at a knowledge of its cause. Natchez and Washington were the only places above New Orleans visited this year.

In conclusion I may add that since this epidemic Washington has not been visited by the fever, although it has been three times prevalent in Natchez. Thus of seven visitations in that city one only has extended to Washington.

Let us now return to Natchez.

Season of 1829.—From 1825 to 1829 Natchez experienced no visitation. In the latter year the fever reappeared. Its history I believe has never been published. Dr. Monette informs us that it was the mildest ever known in the city. He says nothing of its origin. Prof. Carpenter marks it as introduced from New Orleans.

Although I can say nothing on the history of this epidemic in Natchez, I am enabled to give, from Dr. Merrill, an interesting narrative of the

Fever in 1829 *on a Plantation.*—Two miles east of Natchez was the cotton plantation of Mr. Robert Moore, whose residence was on the brow of a hill west of the valley of St. Catherine's Creek. In spring or summer, before ploughing his crop, he removed a heap of putrid cotton-seeds, and the surface of the ground saturated with the rains which had passed through it, and scattered the whole over his fields. Piles of cotton-seeds when pu-

trefying, Dr. Merrill informs me, send forth an intolerable stench. Mr. Moore was in the habit of visiting Natchez, where yellow fever was mildly epidemic. On the 4th or 5th of September he was taken unwell. Dr. Merrill saw him on the 6th, and on the 9th he died with black vomit. On his first visit, the 6th, one or two days after Mr. Moore began to feel unwell, Dr. Merrill prescribed for five other members of the family, children and servants, who had fever; and on the 7th the number had increased to eight; on the 9th it was augmented to ten at the dwelling-house, and fourteen in the "quarter;" the overseer and thirteen negroes. The overseer was taken on the 7th, two or three days after the owner of the plantation. On the 10th he prescribed for four children, the overseer, and thirty negroes; on the 11th for three additional negroes; on the 12th for two children and eighteen negroes; on the 13th for fifteen negroes (the children having been removed); on the 14th for ten negroes; and on the 15th for eight negroes. On the 16th, he had as new patients a young man, Mitchell, who had gone there to assist in nursing the sick, and Webster, a schoolmaster, who had been living there; on the 21st, prescribed for them and several negroes; both the white men died with black vomit; on the 24th, prescribed for eight patients, one of whom was a nephew of the deceased planter, who had come there to assist the family and was taken down that day; on the 25th and 26th, had five patients; on the 27th, the nephew died with black vomit—numbers of patients the same; on the 28th and 29th, number the same. One or two of the negroes only died. On the 29th of October, a lady who was housekeeper in the family and had been to Cincinnati on a visit, returned; she slept one night in the house and then went to another plantation; a few days afterwards she sickened and died of black vomit. All the fatal cases were well marked as yellow fever. Mr. Moore's family had always been so healthy that he was accustomed to speak of his residence as the Montpellier of the Mississippi.

That this was yellow fever it seems impossible to doubt. Mr. Moore had no wife at the time and there were but few white persons to be affected. To the few it was uncommonly fatal. Its greater mildness among the negroes is characteristic of that disease. At first view it would seem that Mr. Moore had introduced the disease from Natchez, and that we have before us a conclusive example of contagion; but if reliance can be placed on the dates of the narrative, and Dr. Merrill gave them to me from a record made at the time, we find the attack of the overseer and the field negroes quartered away from the dwelling-house, to be almost as early as that of the master, and seem required to regard the whole as depending on a local cause. Still, we do not know but that those who really had yellow fever had been in Natchez; which must have been the case with the lady who was landed there, and that the negroes had the ordinary fever of autumn; but Dr. Merrill did not regard it as of that kind, but he looked upon the whole as one disease.

the great epidemic of 1823, the quarantine, as Dr. Tooley informed abandoned; and, for a considerable part of that time, according to nette's* essay, cases of yellow fever were taken from New Orleans ats, through the town, to the hospital; still no case occurred in the n 1829 to 1837, although the fever was epidemic in New Orleans es.

ON OF 1837.—This year there was a severe epidemic. According to nette,† the weather for several weeks before the middle of August y, but afterwards became dry, though showers occasionally fell. ount of the temperature is imperfect, but it appears to have been han that of most autumns. The disease began about the 8th of Sep- its rise was gradual, and the chief mortality was in October. By of November the fever was declared to be gone.‡ Dr. Monette has a minute account of the parts of the city most affected, which were hwestern; the northeastern half, he states, could hardly be said to en visited by it.

hief prevalence was in the neighborhood of the bayous and gullies ut up the portion of the city most desolated by it. The very first curred more than a mile from the landing; and if they arose from roduction of the sick or of fomites from boats, it was known at e when Dr. Monette wrote, in the following year. On the whole, if o credit this gentleman, the fever originated on the spot. Dr. Pol- the newspaper just quoted, declared the same thing. It is worthy d that the inhabitants fled this year as in the preceding to Washing- he newspaper of the 27th of October says, "Washington is quite g village just now; its inhabitants have with open arms received eir hospitable dwellings many of our convalescent or flying citizens. our large mercantile houses have opened assortments of goods there." cording to Dr. Monette,§ the dispersion of the people, even up to the of October, when the epidemic had existed five weeks and was at its had been gradual and slow. Yet not a case occurred among the of Washington, although twelve years had elapsed from the epi- f 1825, and of course there must have been many susceptible persons them. How then could the coming into that town of the inhabi- Natchez, before a single case had occurred in the city proper, have e cause of that epidemic? If it were transmitted in 1825, why was ransmitted, under circumstances much more favorable to that mode agation, in 1837. Prof. Carpenter has marked this epidemic as in- d from New Orleans. The disease was either sporadic or epidemic in other places this year. The next season, 1838, the disease was in New Orleans and Mobile, and did not occur anywhere else in ley of the Mississippi.

ON OF 1839.—We come now to the memorable season to which we

p. 75. † Ibid. p. 75–80. ‡ Mississippi Free Trader (newspaper). § Essay, p. 75.

have made such repeated reference. According to the books of the sexton, the first death from the fever this year was on the 31st of August; the patient a laborer at the landing, who was taken to the hospital. On the 20th of that month, as Dr. Davis informs me, a woman from New Orleans was landed and carried to the hospital, where she died of the same fever. On the 10th of September, the sexton's books report four deaths at the hospital with the same fever, all taken at the wharf; on the 9th, Dr. Davis had a patient there with the same disease, who recovered. On the 11th, the newspapers announced a few cases at the landing. On the 18th, three or four cases, with black vomit, at the landing, are announced, and the alarm increasing. By the 22d, as Dr. Davis informs me, the disease had spread over the city. On the 7th of October, according to the newspapers, the inhabitants of Natchez were effectually scattered, and had taken refuge in the country, the town of Washington, and the village of Selsertown. The epidemic was extremely fatal to those who remained behind. On the 10th, it is stated that the authorities of Washington had prohibited the introduction from Natchez of anything but provisions. Dr. Monette, however, states that this prohibition took effect on the 18th of September, three weeks before, and that yellow fever patients were also excluded; to which he refers the immunity of the people of Washington, notwithstanding an equal degree of exemption in 1817, 1819, 1823, 1829, and 1837, when no such prohibitions existed; nevertheless eight of the refugees were taken down in the midst of the crowded population; enough, we might suppose, to generate contagion, if that disease produces it. On the 9th, 10th, and 11th of November, high winds, followed by frosts, put an end to the disease. The inhabitants of Washington and Selsertown remained exempt.

We have in this epidemic a distinct and undisputed river-shore origin. The filth of the landing and the beach, exposed to the sun by the subsidence of the river, and the steamboats daily arriving from New Orleans and other towns below, where the disease was epidemic, were here also combined. To which of them, or whether to both the disease should be ascribed, must forever, as far as facts collected at the time are relied upon, remain an undecided question. Twelve years had passed away since the fever had begun in that locality, and the same state of things had existed. Why did the disease now occur for the first time during these twelve years?

SEASONS OF 1840 TO 1845, INCLUSIVE.—The epidemic of 1839 was followed by so total an absence of the fever over the Valley of the Mississippi and on the northern coast of the Gulf, that but two cases were recorded as such at the Charity Hospital of New Orleans, and none elsewhere. In the winter of this year, in consequence of the quay-origin of the fever of the preceding year, quarantine regulations of a more stringent kind than formerly existed were re-established, and were in operation in the year 1841. In that year the fever was epidemic in New Orleans, Vicksburg, and some other places. In 1842, in New Orleans and two other places; none in

Natchez. In 1843, extensively prevalent, and Natchez said to be exempt; but Dr. Lysle has given me the names of six patients in Natchez-under-the-hill, who, he says, had the characteristic symptoms of yellow fever. They generally recovered, but one died with black vomit. They occurred early in October. A number of other patients experienced mild attacks. In 1844 the disease was only sporadic in New Orleans; in 1845, scarcely a case, and none either year in Natchez. In the former of these years, as we have already related, many fugitives from Woodville came to Natchez, and some sickened with the disease, but it did not spread.

Since the year 1817, yellow fever has been epidemic nineteen times in New Orleans; six times in Natchez, and once in Washington. If Washington received it that time from Natchez, what prevented her receiving it the other five times? And again, if Natchez received it six times from New Orleans, what prevented its reaching her the other thirteen times? These questions remain to be answered. Meanwhile they stand in the way of the theory of importation, and strengthen the conclusion to which I am carried by the history of each epidemic, that the recorded and recollected facts concerning it do not establish its importation. It seems, in fact, to have been of local origin, although the assigned local causes of most of the epidemics are far from being proved to have been such.

RODNEY.

This village is situated on the left bank of the Mississippi, forty-five miles above Natchez, in north latitude 31° 30′. Its site is the upper and northern extremity of a bottom which widens to the south, and becomes lower so as to be overflowed when the river is high; but the site of the town is too elevated for such an inundation. Near the final extremity of the bottom a ravine enters from the east, and the torrent which flows along it after showers and in rainy weather, when it reaches the plain, turns directly to the north, and discharges its waters into a deep bayou or gully, the water of which rises and falls with the river; immediately below this bayou the plain is wide enough for a square, and here the town was commenced in the year 1823. As to the rest, there is a road or street up the ravine, along which there are houses; and down the river, a street with houses on each side, very near the river, to the west, and equally near the bluff to the east. The steamboat landing is a short distance from the square, down this street. In addition to the commercial and social intercourse between New Orleans and this place, on its own account, goods are landed here for the interior, and these operations have been going on from its first settlement, but, of course, increasing with its growth and the increasing population of the country in its rear. Up to the season I am about to mention, although by no means exempt from the ordinary intermittent and remittent fevers of the country, it had experienced no invasion of yellow fever.

Season of 1843.—In the month of May, 1844, at a meeting of the

Medico-Chirurgical Society in New Orleans, I had the pleasure of listening to a history of the epidemic of the preceding autumn, by Drs. Williams and Andrews, who were entirely convinced of its importation, and I went to Rodney in the expectation of finding a well-marked and conclusive case of that kind. Wishing to review all their facts, I felt it my duty, with them and the other medical gentlemen and several intelligent citizens, to make a patient and rigid inquiry, the results of which I shall now state, borrowing from their papers such facts as may be necessary.*

It appears that when copious rains swell the torrent which descends from the hills through the ravine of which I have spoken, a part of the water, instead of flowing into the bayou, continues down the street to the river, and on its way overflows the square on which the first houses of the town were built. In addition to this, much filth and damaged produce are often thrown upon the beach, and into the shallow water in front of this square, from flat-boats. The latter, especially, was the case in 1836 and 1837, when that part of the beach emitted an intolerable stench in July and August. The ordinary fevers of those years were unusually violent and fatal, but did not put on the form of the epidemic of 1843. At that time the population was double what it was in the latter period, and at all times the village was as filthy as in the epidemic year. During the spring and summer of that year, the inhabitants of the square and whole upper part of the town were very much annoyed by the overflowings of the hill torrents, most of which, however, soon percolated into the soil or evaporated, so that at the outbreak of the epidemic it had nearly disappeared.† About the middle of June, the ensuing year, I made a careful examination of this square, which is nearly covered with houses, for many are built on its interior. I found them all of wood, without cellars or foundation stones, their sills lying directly on the ground, and consequently all that falls through the floors remains there. One of them, standing on Magnolia Street, west side of the square, was taken down on the first day of the preceding autumn. Its foundations, like those of all the rest, except the newest, were in a state of decay, and an offensive odor exhaled from the spot where it stood, indeed, before it was torn down. The ground, as far as I could examine, was wet underneath most of the houses, and water could be seen below some. The house in which the fever commenced was Mrs. Logan's, in the interior of the square, though not far from its southern side, immediately in the rear of the demolished house and to its leeward, as it respects the winds of summer.

August 26th.—Dr. Andrews resides by the side of the demolished house. On this day his daughter was seized suddenly with fever, accompanied with costiveness, vomiting, and a flushed face. It did not assume, with distinctness, the intermittent character. At length she sunk into a listless condition, without fever, had a slight spasm, and died without black vomit or

* N. O. Med. Journal, No. 1. p. 35. † Ibid. p. 36.

hemorrhage. But this cannot be affirmed to have depended on the same cause with those which followed.

September 6.—Young Logan, whose residence I have indicated, seized this day, died with black vomit on the 12th. His attack was six days after the removal of the house of which I have spoken. He was fifteen years old, and going to school up the ravine, away from the river at the time. I could learn nothing of his visiting steamboats or stores where goods were opening, but Drs. Williams and Andrews state that a gentleman saw him on board of one which had yellow fever patients a few days before, which is highly probable, as it was the practice of all who had curiosity or business to go on board every boat that arrived.

7th. Mr. Brown, a merchant on the same square, contiguous to the house that was demolished and very near to Mrs. Logan, was attacked, but recovered.

9th. Mrs. Reed, living between the patients just mentioned, visited Logan, recovered.

10th. Mr. Ricks, in the same house with Mr. Brown, died with black vomit on the 15th.

11th. A brother of Logan, in the last stages of consumption, lodging in an adjoining chamber, died on the 13th, the day after the first.

13th. Mrs. Logan seized.

15th. Mr. Logan, her son, taken down.

19th. Mrs. Martin, Mrs. Logan's daughter, living on the west side of the same square, at a short distance, and having constant intercourse with the family, taken down, died on the 28th. One of the servants experienced an attack. Four of the family died.

After this date many persons living on or around the square, and others scattered over the village, but in the habit of visiting the sick on the square, were seized, and among the rest, Dr. Savage, by which the South lost one of its ablest physicians.

Now the opinion of Drs. Williams and Andrews is, that young Logan contracted the disease by going on board some steamboat, and communicated it to the family and they to others. This may be the truth, but the facts do not warrant the conclusion, inasmuch as the whole family, including himself and all those who have been mentioned, were equally exposed to a nuisance which it is *alleged* produces yellow fever, and if that allegation be true, then the family might have fallen victims to the disease in the very order in which they did. When two assigned causes for a phenomenon coexist, either, *à priori*, might produce it; while neither is known to have done so, it is altogether arbitrary to ascribe it to one of them. The advocates of local origin have the same right to ascribe it to nuisances, and the late Dr. Savage and Dr. New asserted that right. But correct logic denies a demonstration to both parties,—in other words the history of these cases *decides* nothing relative to the origin of the disease.

Drs. Williams and Andrews, however, found another source of imported infection, and do in fact derive the epidemic from an additional magazine of fomites. The second case, that of Mr. Brown, who sickened on the 7th, the day after the first patient, and Mr. Ricks, who was seized on the 10th, four days after the first, are ascribed by them to fomites attached to goods imported into a mercantile house nearly adjoining Mrs. Logan's, which goods they assisted in opening. These goods were received on the 3d of September, and consisted of four boxes of American prints, put up in Philadelphia, and sent *via* New Orleans. I was told, furthermore, that six bales of damaged blankets had been opened by these gentlemen and others in the same store, and emitted an offensive smell; but the bill of lading was dated on the 12th, in New Orleans, and the goods could not have been received before the 14th, seven days after Mr. Brown was attacked, four days after the attack of Mr. Ricks, and only one day before he died. Thus if Brown and Ricks contracted the disease from fomites, they must have adhered to the boxed-up calicoes which had only been lodged in a warehouse in New Orleans on their way from Philadelphia. Several others besides the house which received these goods, received supplies (as they do every year) of various articles, including blankets, from the 10th to the 14th of September, but there was no evidence of their introducing the fever, which had, indeed, distinctly shown itself before those dates. Now the remarks made on the other branch of this theory are applicable to this. As Brown and Ricks lived on the square, and breathed the same atmosphere with the Logan family, they were liable to the disease *if* it could originate there. Thus, without denying the transmissibility of the fever, or asserting its local origin, I am compelled to dissent from the conclusion of Drs. Andrews and Williams, and say that the origin of this, the only epidemic of Rodney, for the twenty years it had existed, during which the fever, in New Orleans, had been sporadic six times and epidemic fourteen times, with regular communication between the two places, is *not* established. Indeed, the theory of nuisances derives rather more support from this history than that of fomites and contagion, both of which must be resorted to in this case to sustain the doctrine of importation, for every year added something to the foulness of the square on which the fever broke out, by the joint decay of the wooden houses and the accumulation of offal matters beneath them, and in the adjoining bayou; but every year did not add to the importation of goods, for, according to Drs. Williams and Andrews, the population (and consequently importations) of the town were twice as great in 1836 as in 1843 when the disease occurred. Finally, the fever this year began in New Orleans on the 5th of July and was epidemic in August. So that it prevailed there for two months before its appearance in Rodney, during the whole of which period steamboats were stopping and discharging passengers and merchandise every day.

In conclusion, I may state that Mr. John A. Watkins, the oldest resident

f Rodney, informed me that persons had died there of the fever contracted n New Orleans, in 1827, '28, '29, and '35 without communicating it.

VICKSBURG.

Vicksburg was begun, as we have seen, in 1819. In 1827 Dr. Anderon, now of St. Louis, saw a few sporadic cases, as he regarded them, of the ever; and again a greater number in 1837, in both of which years it was xtensively prevalent in the Valley of the Mississippi. Dr. Hicks also saw our cases in the latter, which ended in black vomit. One of the patients ad come from Natchez—the rest were of the town. One of Dr. Anderson's atients, in 1827, was lately from the State of Illinois. In 1838 there was one. In 1839 it was according to Dr. Harper sporadic. He saw cases ith black vomit. Dr. Gill reported a patient as dying of yellow fever, and e town council altered it to bilious fever. Dr. Hicks saw quite a number f cases along the river-shore, in the neighborhood of the landing, among e poor and dissipated. All the houses were filthy underneath and wet ll July. The margin of the shore had been raised by shavings, various inds of decomposable matter, and dirt. Many patients from Natchez with ellow fever were put off here. This was the great epidemic year of the 'alley of the Mississippi. In 1840 no cases were noted.

Season of 1841.—This year, the 22d from the settlement of the town, as the first in which the disease assumed an epidemic character. The bservations relative to its onset, which I was enabled to collect, are not ery numerous or satisfactory. That it chiefly invaded the southern part f the city, on the hills, where the population was relatively sparse, was tated by all with whom I conversed.

Dr. Hicks on the 20th of August had his first case. The patient, Collins, had come from a levee twenty miles up the river. His second patient, Owen, about the 1st of September, had been three weeks on a plantation up the river. Was taken, as he reached home, with what was called the Yazoo or swamp fever; got so well as to sit up, relapsed, and died on the 12th with black vomit. On the same day Dr. H. was called to a Dutch girl, and three or four others in the same house (locality not mentioned). She died with black vomit. The disease now began to prevail extensively.

Dr. Harper's first patient was a woman, on the hill. Date not given. His second was on the 2d day of September, also on the hill, and soon after two others sickened in the same house.

Dr. Anderson's first case was an Irish laborer; his second, Judge Martin, living back on the hill, taken immediately after his return from an excursion into the Yazoo swamp; third case, on the hill; fourth, the sheriff and his family, on the hill, in the centre of the town. None of these patients had visited steamboats.

Dr. Balfour's first patient was on the 8th of September, second on the 9th, both on the hill. A large number of cases occurred in a house half-

way up the hill from the river, which was crowded with poor Irish. In the neighborhood of this house, at three o'clock P. M. of the 4th of July, 1844, my thermometer, buried an inch beneath the surface of the ground, rose from 90°, the atmospheric temperature, to 116°.

Dr. Emanuel thought the transition from ordinary autumnal to yellow fever was gradual. He spent much time around the destitute sick, in giving them assistance, and often breathed a most offensive atmosphere; but did not contract the fever. He observed that nurses and others did not often have it.

The negro population according to Dr. Hicks, remained unaffected till near the end of October, when it became prevalent and fatal among them. It ceased about the 9th of November, after a second severe frost.

Previously to and at the time of the outbreak of this fever, steamboats from New Orleans, where the fever was epidemic, were constantly arriving, and landing goods and passengers, as had been the practice from the first settlement of the town. The localities and histories of the first cases seem to have convinced all the medical gentlemen of the place, that they were indigenous. Nobody, I was assured, attempted to show importation. Prof. Carpenter is silent respecting this epidemic.

The season of 1842 was said to be free from the disease, but Dr. Balfour saw a well-marked case with black vomit in a young woman.

SEASON OF 1843.—Vicksburg participated in the extensive epidemic prevalence of this year. Dr. Anderson observed that the ordinary autumnal fever assumed many of the symptoms of yellow fever. Dr. Emanuel did not hear of any cases with black vomit. Dr. Hicks, had such cases but they were not numerous. Dr. Harper saw a few; they were scattered over the city and did not seem to be connected with the wharves or steamboats. On the whole this was a mild and limited epidemic.

Prof. Carpenter notes this epidemic as probably introduced from New Orleans. Dr. Monette remarks that Natchez was this year screened by the revival of her quarantine, and Vicksburg invaded from the want of such protection. It may be asked what defended her in the preceding twenty-two years, during which the fever was epidemic in New Orleans fifteen times?

In 1844 and '45, Vicksburg remained free from the disease; the narrative of the invasions suggest the following remarks.

1. The commerce of New Orleans with Vicksburg steamboats has always been considerable, as it is a chief landing-place for the interior, including Jackson, the capital of the state; and as the population was greater in 1836 than it was in 1841, the importation of goods for city consumption must have been greater. 2. The great excavation which has been described commenced in 1836, and was continued to 1839. Now in 1837 it was distinctly sporadic; in 1839 it reappeared; and in 1841 it was fatally epidemic. 3. As we have seen, much of the removed earth was deposited opposite the

ower part of the city, on the edge of the narrow plain, and built upon, the oat-landing being at the same time brought down from that part which as first built. This transfer, and the general decline of population, with onsequent vacated and foul houses, as already described, took place not ong before the epidemic of 1841. Thus of the various alleged causes of ellow fever, one, the commercial, had long existed; the other two, fresh earth nd nuisances, came into existence just before or about the time of the ap- earance of the fever.

MEMPHIS.

Dr. Wyatt Christian came to Memphis in the year 1826. Had seen im- orted cases of yellow fever in different years down to 1844, when I con- ersed with him. Many of them proved fatal in the hotels and boarding- ouses, but he never saw the fever propagated in a single instance. In 842, the steamer Louisiana stopped at the wharf for twenty-four hours, aving sixteen yellow fever patients on board; and the people of Memphis isited her throughout the whole time; but no one contracted the fever.

Season of 1828.—In this year yellow fever was epidemic in Memphis, he history of which, as communicated to me by Dr. Christian, I shall now roceed to record. At that time Memphis was an inconsiderable village, ith scarcely any population in its rear, and so little commerce or social ntercourse with New Orleans that steamboats seldom stopped, and a fort- ight frequently elapsed without a single landing. For some time before he fever broke out, no steamer had stopped. The fever that year was epi- demic in New Orleans and sporadic in Mobile; but no case was landed at Memphis. Autumnal remittent and intermittent fevers this year were more severe than Dr. Christian has ever seen them since.

Case 1. The first case of yellow fever occurred on the 8th of September, in a laboring man, who had not yet spent an autumn in Memphis. He worked about the flat-boat landing and on the boats, and lodged between the bluff and the Mississippi, just below the mouth of the Wolf River. On the fourth day he died with black vomit.

2. His wife was taken on the next day after him and died on the sixth day with the same symptoms.

3 and 4. Their two children were attacked in the same manner with the parents, immediately after the mother; but both recovered.

5 and 6. About ten or twelve days after the first of these attacks, two men, one a hatter and the other a gardener, who lodged in a house under the bluff, about 100 yards from the other, were taken with the same disease, one dying with the other without black vomit.

7, 8, 9, 10, and 11. We must now turn to another part of the town. A quarter of a mile from the river and from the patients just enumerated, on the upper terrace, was a brick yard, at which there were six operatives, five white and one black. While the woman, case No. 2, was still alive, that

is, before the 15th, one of these white operatives was seized with the same fever; in three days two others, and on the following the remaining two; the negro only escaping. Two of these patients died with black vomit, the other three recovered. It was not known that these individuals had had any communication with the house of the patient No. 1.

Before the last of these patients had died, the fever had begun to show itself in the village, containing from 250 to 300 inhabitants, every part of which it invaded. The whole number of cases was about forty, of which fully one-half proved fatal; no negro was attacked. The duration of the epidemic was about six weeks, or until near the 1st of November.

Symptoms.—As it might be doubted whether this was really yellow fever, I desired Dr. Christian to give me a detail of its more prominent symptoms, which were as follows: The attack was generally sudden, the individual being in good health up to the time of it. He had slight chills and flushes of heat, with great sense of weariness. The hot stage which succeeded was intense and lasted from twenty-four to thirty-six hours, when it ceased and did not return; but the patient, when recovery did not take place, remained with a pulse beating between eighty and ninety, restless, thirsty, destitute of appetite, with a cool skin, and a tongue exhibiting rather a red and flabby appearance. In this condition he would lie two or three days, not sleeping any, and having his secretion of urine entirely suppressed. His stomach would then become irritable, and at length he would begin to vomit. The matter ejected, at first of a greenish or bluish tint, soon showed dark-colored flakes, and ended in a black color which left an indelible stain on the floor. While lying in the state which preceded the black vomit, hemorrhage from the gums, sometimes from the nose, and in one case from the bowels, occurred. But one recovery took place after black vomit.

There can be no doubt that this was genuine yellow fever. Dr. Rose and Dr. Russell both pronounced it so, and Dr. Christian referred me to the latter, who had emigrated to North Alabama, for a verification of his own history. Unfortunately, I deferred doing so till Dr. Russell died. Dr. Rose had previously died. All who know Dr. Christian, as one of the most respectable physicians and citizens of Memphis, will confide in both his veracity and correctness of observation. Unless in the absence of all opposing testimony we impugn them, we are, I think, almost compelled to admit that this was an instance of purely indigenous epidemic yellow fever.

Of local causes, Dr. Christian's mind was turned to two:—

1. The foul state of the flat-boat landing, immediately below the mouth of Wolf River, where the first cases occurred.

2. In 1827, the year before the epidemic, three cotton-gins were erected in Memphis, and worked throughout the following autumn and winter. One of them stood between fifty and one hundred yards from the house where the first cases occurred; the other two about the same distance from the brickyard where the other group of early cases was. As this was in

e early periods of cotton-planting in West Tennessee, gins were not yet merous in the country, and a great quantity of picked cotton was brought these establishments. None of the seeds separated during the winter re removed, and Dr. Christian estimates that the piles around the diffe- nt gin-houses must have amounted to several thousand bushels. Exposed the rains of the succeeding spring, and sun of the following summer, these cumulations passed into a state of putrefaction, and sent forth a stench of an id quality, which, evening and morning, could be perceived at least half a le. This odor began to be perceptible about the 1st of September, and the 1st October the piles were burned up. One evening during the pre- lence of the fever, a lady walked with her husband into the neighborhood the gin near the river, and found the air very offensive. On returning me, she was seized with a chill, and had a serious attack of the prevailing ver, but recovered.

Whatever importance may be attached to this statement, the reader cannot il to observe its coincidence with that given on the authority of Dr. Mer- ll concerning the fever on the plantation of Mr. Robert Moore, near latchez.

GALLIPOLIS, O.

"Dr. Miller, of New York, in his excellent essay on yellow fever, refers to the journal of a voyage down the Ohio, in 1796, by Mr. A. Ellicott. This judicious observer was a witness, at Gallipolis, inhabited by some miserable French families, to the disease, which raged violently, the fatal cases being generally attended with the symptom of black vomit. "The fever could not," he says, "have been taken there from the Atlantic States, as my boat was the first that descended the river after the fall of the water in the spring. Neither could it have been taken from New Orleans, as there is no communication up the river at that season of the year. [This was prior to the era of steamboats.] Moreover, the distance is so great, that a boat would not have time to ascend the river, after the disorder appeared that year in New Orleans, before the winter would set in." [EXTRACTED BY THE EDITOR.]*

NEW DESIGN, MO.

"In 1797, the disease appeared at New Design, fifteen miles from the Mississippi and twenty from St. Louis, and carried off more than one-fourth of the inhabitants, although no person during the preceding twelve months had come to this village from any place at which the malady prevailed. As these facts are attested by Dr. Watkins, who had seen the disease in Philadelphia, and as an identity of disease supposes an identity of cause, it is shown indisputably that fevers with the pathognomonic features of typhus icterodes, do occur in positions which forbid the assumption of importation." [EXTRACTED BY THE EDITOR.]†

* Army Statistics, p. 9. † Ibid.

FORT SMITH, ARK.

Fort Smith* is seated on the left bank of the Arkansas River, near the mouth of the tributary called Poteau. "Lakes and marshes abound in every direction, some being subject to be inundated from the Arkansas and Poteau Rivers."†

YELLOW FEVER IN 1823.—In the work just quoted, p. 41, we have the following report from Assistant-Surgeon Finley:—

"FORT SMITH, October 15, 1823.

"SIR:—From the accompanying report of the quarter ending the 30th September, you will observe that the mortality of this post has been unusually and alarmingly great. Prior to the 5th of September, our diseases did not assume a character calculated to excite any anxiety, but were such as we anticipated in this season and climate. About the period just named, the fever became more rife, and manifested a violent grade of action. When first attacked, the patient complained of slight chilliness, which was soon succeeded by fever, general pains, most severe in the head and loins, and excessive irritability of the stomach, attended with continued vomiting and excruciating pain in the same region. Although the application of a blister invariably relieved the pain, it had not the effect of arresting the vomiting, which only ceased with death. The matter discharged from the stomach was black, and had the appearance of clotted blood. The pulse was quick and soft, and the eyes were red and painful. After the first twelve or eighteen hours, delirium ensued; the tongue became black, rough, and dry; the thirst, owing to the irritability of the stomach, was unquenchable; and finally, coma and convulsions announced the approach of death." [EXTRACTED BY THE EDITOR.]

In New Orleans, Mobile, or Natchez, a fever of this character would undoubtedly be pronounced yellow fever. If it were, it must have been indigenous, as steamboats, in 1823, scarcely ever went to that point, and *could* not have done it in July and August.

CHAPTER VI.

ÆTIOLOGICAL DEDUCTIONS FROM THE FACTS PRESENTED IN THE FOREGOING HISTORIES.

LET us now proceed to ascertain the bearings of the facts which have been set forth, on the origin and spread of yellow fever.

Passing by the vexed and difficult inquiry, whether the yellow fever of Havana originated there, or was introduced from abroad, we may speak and

* North latitude 35° 22'. † Army Statistics, p. 229.

t of it as a disease of that city; seeing that although it is not exten-
ly prevalent every summer, it is never absent, and thus, if not a native,
naturalized endemic. In reference to the first case that ever occurred
at city, it may be said that if the cause was generated there, the subse-
it prevalence of the disease has no doubt depended on the continual
ration of the same cause.

' the disease was imported, we may assume, with equal confidence, that
introduction and continuance of the fever have depended on one of two
es,—either a contagious emanation from the bodies of the sick, in per-
al succession, or a peculiar fermentative power in the portion of em-
ned air originally imported, whereby it transformed that of Havana
its like, and has ever since kept up the disease.

ut the same views are not applicable to New Orleans, where a colder
er might destroy the cause of an imported disease, which would not
pear till it was reintroduced. Hence the fever may prevail annually
Iavana, although originally an exotic, but be frequently extinguished in
Orleans, and require to be imported anew.

ur first inquiry relates to contagion. In the prosecution of this, the
s of logic require the exclusion of all cases in which the disease is said
ave been contracted by going on board of a ship or boat where there
yellow fever patients, or by visiting a patient in a town affected with
fever when it is epidemic, for the individual in these cases is exposed
he same atmosphere which may have produced the fever in the sick, and
annot be told whether he contracted the fever from them, or from enter-
the same localities which had occasioned it *in* them. We must also, for
same reason, exclude the cited instances of epidemic fever soon after the
ival of a ship or boat, because it may have brought a portion of the at-
sphere from the sickly port whence it sailed, or may have arrived at the
ment when the disease was about to appear from local causes. Thus re-
icted, the number of facts going to show the propagation of yellow fever
contagion is surprisingly small, and most of them far from being un-
estionable.

1. When speaking of the introduction of the yellow fever into Opelousas,
1837 and 1842, we gave an account from Prof. Carpenter's book of the
parent successive propagation of the disease from two strangers who arrived
ere from New Orleans and sickened of the fever. It will be recollected
at steamboats do not reach this town. But it must be remembered that
the former of these years the disease was extensively prevalent: in the
ter, however, it was limited to New Orleans and Mobile (see p. 243).

2. When the body of Dr. Smith, of Plaquemines, was taken to New Iberia
e that article), it was said there was no fever in the village, but that
arly all who visited the church in which the corpse was deposited or at-
ded the funeral, were soon afterwards seized with the fever. This was in
39, when the disease was more extensively prevalent than in any other year.

3. Under the head of St. Francisville there are details which show an apparent propagation of the fever from one person to another; but the fever that year was extensively epidemic, and previously to the occurrence of the second link in that chain of cases, it was prevailing in the adjoining village of Bayou Sara.

4. When treating of the epidemic of Woodville, we found that on a certain plantation, a number of negroes who had not visited the town experienced attacks of the fever after the death of one who had contracted it there; but the author of this important observation likewise informs us, that the disease occurred on some plantations, where, as far as could be ascertained, it had not been introduced. There were, indeed, signs of an epidemic constitution for several miles around Woodville.

5. By referring to the history of the yellow fever in New Orleans, for the year 1841, the reader will find an account from Dr. Beugnot and Luxenburg, of its apparent introduction and spread by officers and seamen of the Talma, anchored off La Fayette, adjoining the city, where, as they state, the fever had not in any previous season commenced.

If the history of the disease for the last fifty years in the Valley of the Mississippi furnishes any other facts going to show the contagiousness of yellow fever, I have not been able to find them. There are, however, two analogical arguments in support of this opinion, which must not be overlooked.

1. The fever is not intermittent, but approaches to the continued type. Now typhus and typhoid, which are continued fevers, are known (or believed) to generate contagion; and from analogy we might predicate the same of yellow fever.

2. We have seen as a general fact that yellow fever affects persons but once, which, as all the world knows, is true of the eruptive fevers, and as they are contagious, we might conclude that yellow fever is the same. But on this method of analogical reasoning, yellow fever ought to be eruptive, as well as contagious. If it fail in one it may fail in the other also. The relation between eruption and contagion is in fact much closer than between immunity from second attacks and contagion, for typhus fever and syphilis are contagious and eruptive, yet second attacks of the former are not uncommon, and it is not proved that an attack of the latter bestows any immunity against future infection.

There is, moreover, a difference between yellow fever and the true eruptive fevers, as to exemption from second attacks; for residence in a cold climate destroys it in yellow fever, but no change of climate has that effect in the eruptive fevers. Thus the contagiousness of yellow fever cannot be established by this any more than by the other.

Let us now examine the facts which oppose the doctrine of contagion.

If we look to small-pox, measles, and scarlatina, the best examples of contagious fevers, or even add to them typhoid and typhus fevers, we find

certainly differs from all other contagions, if it cannot exert itself
fore as *after* the summer solstice.
soon in autumn as the cold becomes great enough to freeze the
ellow fever ceases, but cold does not, any more than heat, put a
nall-pox, measles, and typhoid fever. And here again yellow fever
and the test.
fevers just mentioned prevail both in town and country; but yel-
is almost limited to the former;—another failure.
ll-pox, measles, and scarlatina, are propagated and become epi-
salubrious, as readily and certainly as insalubrious localities;
not true of yellow fever.
e see that this disease does not conform to the laws of contagious
t stronger facts remain to be stated.
g connected with the whole subject is more definitively settled than
ons may die of yellow fever, both in town and country, without
cating the disease. Many accurately-observed and well-attested
this kind are scattered through our historical narratives; and a
ater number might have been given. Now, such events in such
the true tests of the contagiousness of this disease, for no other
ause is present. In New Orleans and other commercial cities, in
part of summer and early autumn, there *is* another cause; and
possible to analyze the phenomena, and say that one depends on
e, and another on contagion? It may be said, however, that the
sphere is not the direct cause of any of the phenomena, but the
the contagiousness of the fever. Thus, if two individuals in the
p had received the *semina* of the fever in Havana, in the month
st, and one should be landed on a plantation below the city, and
r brought into it, and both should sicken, the city atmosphere
act on the system of one as to cause it to secrete contagion, while

contagion, and consequently, that it produces no effect beyond the limits of such an atmosphere, and, therefore, *seems* not to exist, when it really does. According to the preceding view, contagion is not produced without the influence, *on the body of the sick*, of an impure atmosphere. According to this view, contagion is inert without the predisposing influence of an impure atmosphere *on the bodies of the healthy*. This recognizes the action of two causes, and if either be absent, the fever will not appear. It may be called the hypothesis of compromise, for it tolerates, or rather requires, all that both parties demand. As we have many examples of co-operative and successive influence of remote causes in the production of disease, this hypothesis wears a most plausible aspect, and has drawn to itself nearly all who once held to the doctrine of the sufficiency of contagion, and not a few of those who formerly believed in local causes exclusively. It accounts, in a general way, for the absence of the fever from filthy, but insulated towns, where but one of the causes exists; for its frequent prevalence in commercial towns, which hold intercourse with those further south; for its not appearing in towns which are free from impurities, although cases of yellow fever may be introduced into them; for its prevalence in autumn, when the air from the heat of summer is most impure, and for its cessation in winter, when the further development of exhalations is arrested by frost. It inculcates cleanliness to prevent the development of the predisposing cause, and non-intercourse with places where the fever is prevailing, to exclude the exciting cause; prudently attending to both, lest the efforts to suppress either should be unsuccessful.

Now the objections to this hypothesis are:—

1. That it combines an admitted and an assumed cause: the local contamination is a fact—the contagion an assumption.

2. That in many invasions of the fever cases have occurred under circumstances which almost precluded the possibility of communication with the sick, and must therefore be referred to the admitted local cause.

3. That the fever often appears almost simultaneously in various parts of a town, in the same manner as epidemic cholera, or as autumnal fever among the inhabitants of the country.

4. That it has (as we shall hereafter see) commenced and prevailed in ships, and in some localities on land where the alleged exciting cause, contagion, could not possibly be.

5. That having admitted one cause, which appears sometimes to have been sufficient, of itself, for the production of the disease, it is unphilosophical to admit another, the existence of which has not been proved.

There is however another view which avoids the last objection, while it comprehends both local contamination and contagion. According to this hypothesis, contagion acts upon the impurities suspended in the atmosphere of places where and when the fever prevails, and excites in them an intestine or fermentative action, which transforms them into its own nature.

se in others by their direct action, are not in fact contagious, but
ments, capable of transforming the impurities of the atmosphere
true and only cause of the fever.

ypothesis of fermentation certainly avoids some of the objections
against that of contagious propagation by personal intercourse, as
admit, that it can go on rapidly and in a short time transform the
purities of a city into a poison, like itself, so that the fever may
ceed simultaneously in various parts of the locality; it also explains
luction of a fever atmosphere in a particular portion of a city; and
ccounts for the production of the disease in those who only ride
that part, which the doctrine of personal contagion does not.

theless, it must not be forgotten that this hypothesis rests entirely on
ions, as indeed the whole doctrine of gaseous or aerial fermentation
l is, moreover, liable to some objections which I shall proceed to
But previous to doing this, it will be proper to bring forward and
ate with this, another branch of our subject. In the beginning of our
it was stated hypothetically, that if yellow fever were originally
ed into Havana, and thence upon this continent, it might have
e either by the importation of contagion, or of a portion of that
ere, or rather of its like, which produced the first case, and which
a ferment in the air of Havana. Now what I am about to say,
ply equally to both these alleged ferments, and embrace every
case of importation. When a ship arrives in New Orleans
yellow fever port, and brings patients with that disease, she has, we
mit, within herself, all the causes which prevail in the port from
she sailed, the local summer atmosphere and the emanations which
send forth; and those who visit her may contract the disease
y as if they had visited the town from whence she sailed; but to
er arrival the cause of a subsequent epidemic, it is assumed that

casion no yellow fever beyond their own limits. When yellow fever is epidemic in Mobile, for instance, steamboats run daily up the Alabama River, and lie at the wharves of Kahawba, Selma, and Montgomery, while their inhabitants are suffering under remittent and intermittent fever, yet no yellow fever appears. At New Orleans, while yellow fever is raging in the city, and especially near the river, the environs which lie contiguous to the cypress swamp in its rear, are ravaged by remittent and intermittent fevers. Lastly, up the Mississippi River, it is chiefly in the older towns, where the malarial impregnation has become feeble, and autumnal fevers are comparatively rare, that yellow fever makes its appearance. If this were not the fact, the leaven of yellow fever would transform the malaria of autumn into the cause of that disease, and spread it over the whole country. We may take it then as a settled fact that the yellow fever leaven exerts its transforming power only on the impure air of certain localities, and that in absence of such impurities, there is and can be no spread of that disease. We have then in this state of the atmosphere over yellow fever localities a *conditio sine quâ non* to the spread of that disease from the vessels which import the alleged ferments. But is this malaria of our commercial towns and cities inert and harmless of itself? By no means. For when and where yellow fever does *not* occur, these localities in summer and autumn are infested with a remittent fever, which bears so striking a resemblance to the remittent fever of the country, that every physician regards them as the offspring of the same cause in a state of modification. In the country this agent is generated in swamps, and other humid places, where the recrements of plants and insects are subjected to decomposition, in the towns where yellow fever oftenest prevails, other vegetable recrements, animal exuvia, and exhalations and secretions from a dense population, are subjected to the same decomposition. As the decomposable materials are not identical, the products of fermentation cannot be identical. The rural malaria produces one modification of fever, the civic another. Now is it not remarkable, when these malaria approach so near to perfect identity, that the imported ferment should readily change the civic malaria into yellow fever gas, but produce no effect whatever on the rural malaria? When the two, judging by their effects, so far from being distinct species are not even striking varieties, how is it that the foul air of Havana or the exhalations from the body of a yellow fever patient can start one into active and deleterious fermentation and be utterly inert when mingled with the other? The hypothesis of ferments is bound to answer this question; or else to establish itself by positive facts.

This latter it has attempted to do in the following manner:—

1. Ships from Vera Cruz or the Havana have almost always arrived in New Orleans just before an outbreak of the fever.

2. During the war with England, when the intercourse with the more southern ports of the Gulf was suspended, or nearly so, the fever was absent.

The previous arrivals without the supervention of the fever, show, according to the theory of ferments, that the local atmosphere was not yet impure enough for the alleged fermentation; when its impurity has become great enough for the fermentation, that process may or may not be necessary to an outbreak of the fever.

6. If the towns of the interior are not in general affected till some time after the disease has prevailed, that may arise from a slower development of the required local atmosphere, and not from a necessary lapse of time for the production of the ferment in the atmosphere of the city. The conditions, including heat necessary to a local contamination, are less active in the smaller towns north of New Orleans than in that city.

7. That none of the interior towns have it when New Orleans is exempt. This only proves that the causes which exempt that city, to wit, the absence, not of an imported ferment, but a local impurity to be fermented, have been equally operative in the towns of the interior.

8. If it generally appears in the neighborhood of wharves, it may be because the local contaminated atmosphere is there most concentrated.

It appears then, that the facts admit of a different interpretation, and do not, therefore, establish the existence and importation of a ferment. But to take away the tendered proofs of a theory does not *disprove*, but merely leave it unsupported. In that condition I conceive the doctrine of ferments now to stand; and in the absence of the support by facts, let us inquire into its probability and necessity.

1. Although I have called it a theory, we see that it is only an hypothesis, an assertion to be proved—an assumption to explain certain facts, which admit of a different interpretation; which, however, it must be granted, may not be the correct one. If, however, they can be differently explained, they can no longer be exclusively applied to the hypothesis to which they were referred, which before it can reclaim them must establish itself by other evidences.

2. This hypothesis is not sustained by any known analogy, and, therefore, can derive no support from reasonings carried from the known to the unknown.

3. It multiplies causes without having the necessity for them shown. If a peculiar impure state of the atmosphere is necessary to the action of the alleged ferment, it may be said that the disease arises from that atmosphere itself, independently of any transformation by fermentative action. This is only elevating a condition, which the other hypothesis admits, to the rank of a *sine qua non* in the production of the fever, the cause, and the *only* cause. It is substituting the impure exhalations themselves, before the alleged fermentation, for the products of that fermentation. Their existence is granted, indeed, demanded by the hypothesis of fermentations, for without them the ferments could not spread the disease; but the very existence of the ferment is an hypothesis. If *they* necessarily exist, whenever the fever

ow spreads through a community, or appears successively in different
the first case of the disease cannot have been produced by morbid ex-
n from the body of one laboring under that disease, and must therefore
rded as the product of a cause resulting from chemical action on mate-
mposing the earth, or resting on its surface. But if one case could
inated in that way, others may, indeed must, whenever the same con-
exist. The same conditions may not, however, exist but at the spot
the first case was generated, and the disease may everywhere else
on derivation from those who labor under it. But we have shown
tter of fact that it is not thus propagated. We have also shown that
facts and arguments stand opposed to the hypothesis of ferments.
f we can show that the disease has arisen independently both of con-
and of ferments, under circumstances which deteriorate the atmo-
with the material on which the ferment is said to act, we have made
case identical with that which originally produced the fever, and
that it is still, as at its primitive appearance, a disease of local origin,
spring of certain conditions, and a necessary occurrence whenever and
er those conditions exist.
at, then, are the proofs of this origin?
When treating of the origin of the fever at Pensacola, I have given
story of the generation of the fever on board of three national ships,
atchez, Vincennes, and Hornet, altogether apart from any external
ce; and when giving its history at Donaldsonville, I stated an in-
of its being generated in a small boat on a voyage from Baton Rouge
town, the disease not existing in either. I might greatly extend this
gue if I chose to introduce cases of a less rigid character, for the
r of instances of alleged spontaneous origin on ships, in the Gulf of
, is very great, but I do not wish to employ apocryphal data.
Passing by New Orleans, where the local and commercial conditions

powerful advocate of importation, that the disease has occurred from local causes; to Apalachicola Bay, where, according to Dr. Hart, several cases occurred when no ships had arrived from a distance; to Fort Smith, where the disease appears to have prevailed in 1823; to Memphis, where it was epidemic in 1828, and as far as observation could guide those who witnessed it, arose from conditions existing on the spot; finally, in our examination of the origin of the fever in all the times and places where it has prevailed in the Northern Basin of the Gulf, we found that in almost every case which admitted of a strict examination, the asserted importation of the disease could not be made out, but if it were not imported, it was of local origin.

3. It does seem to me, then, that the fact of a local origin of some cases is as well established as medical facts generally are, and that we are at liberty to reason from it as a fixed *datum*. But does this prove that the disease is indigenous? The answer must be in the negative. For it is *possible* that in all these cases a portion of the ferment may have been introduced long before, and lain dormant for want of that element in the atmosphere on which it is said to act, and it is also possible that when such an atmosphere was generated the ferment took effect. We cannot disprove this, and therefore admitting all the facts which have just been cited, they do not demonstrate that the fever arose from causes entirely local. But although that grade of proof is not attainable, we may certainly approximate to it; for in the first place the very existence of such a ferment is, as we have shown, an assumption; in the second place, as it is represented to have been a product of the South, and as cold suddenly arrests the fever, it seems highly improbable that it could survive the action of several winters; and in the third place, it is contrary to all analogy that it should neither undergo spontaneous decomposition through so long a period, nor evaporate, nor be absorbed by the bodies to which it adhered, through a series of years, and thus be lost. If these reasons do not annihilate the claims of the doctrine of a ferment, it must, I think, be admitted that it reduces them to the very lowest degree of probability.

4. The occurrence of the fever from local conditions, independent of any foreign agency, being established in even a single instance, the controversy is, *de jure*, at an end, for if it can be thus generated in one case, it may in all, and to say that it is not, is to superadd a hypothetical to a known cause, in violation of the rules of philosophizing. He, indeed, who admits its production in this manner in one instance, and denies it in others, is bound to support his denial,—he brings upon himself the *onus probandi*. When a phenomenon has been once proved to arise from a certain cause, true logic requires us to refer it whenever and wherever it may afterwards appear to the same cause. If then yellow fever on board the Ship Natchez, or in the vicinity of Washington, or in the village of Memphis, arose from local causes only, it has arisen in every other town

perature is reduced below a certain point.

hile like autumnal fevers it extends indefinitely to the south, it e them, shown itself limited to the north, but the limits of the two are not the same, the boundaries of the former being much higher ose of the latter.

ithin these limits it invades certain localities and is never seen in and the same is true of autumnal fever. From some it is scarcely ny year, while others are invaded only now and then, and the same f them.

some seasons, as those of 1819, 1827, 1829, and 1843, but above all of 1839, it appeared as a widespread epidemic, while in others it n limited to a few places, or even to New Orleans; and autumnal ries in a similar manner.

is often seen to be influenced in its aspect by the cause of autumnal The cause of typhoid fever has now and then produced modifications ymptoms. In the year 1811, at Terre aux Bœufs and New Orleans, rmy, it was modified by scorbutus. During the prevalence of epi- holera, in the latter, it assumed many of the characteristics of that ic.

whole of which is true of autumnal fever.

successive years, at the same place, it presents diversities which can- explained; and in the same season, in different localities, variations acter have been noted; which is also the case with autumnal fever.

conforming to nearly all the laws of our non-contagious, endemical, ic fever, it presents additional claims to be regarded as such. It in fact all the requirements of the theory of indigenous origin.

ellow fever, then, it may be asked, merely the remittent autumnal ith which we are all familiar? The answer according to these views

ber to the milder form of an ordinary remittent, according to the tabular view presented at p. 197.

Such is the malarial theory of this formidable disease; that which is held by a majority of the physicians of the South;—a theory which inculcates cleanliness and free ventilation in houses, yards, alleys, streets, boats, ships, and wharves, to obviate the development of civic malaria, which being prevented, the fever, according to this theory or according to the theory of an importation of ferments to act on that malaria, would equally fail to appear.

But I cannot regard this theory as finally established, although obnoxious to fewer objections than the theory of ferments, for,—

1. The whole pathological history of yellow fever *seems* to constitute it a specific fever, differing from an autumnal remittent too far to admit of its being a mere variety of that disease.

2. It has occurred in localities where civic malaria can scarcely be admitted to exist, as in Washington and its vicinity, in the state of Mississippi; in Opelousas, and in the Navy Yard on Pensacola Bay, where a white sand drift constitutes the surface of the ground.

3. It has been produced by exposure to the air, which has escaped from goods sent from a city where the disease prevailed. [?Ed.] But I know of no facts which go to show that autumnal fever is ever produced in that manner. It is scarcely necessary here to repeat that there is no well-authenticated example of its spreading from this source.

4. While the condition of a town to all visible appearance continues the same, the disease will appear and disappear, precisely as it does while the commercial intercourse with a place continues unchanged.

Until these objections are removed, the cause of this disease should be kept *sub judice*. We are not compelled to choose among conflicting theories and declare that which is best supported to be established. It may be more probable than any other, and yet not be true.

CHAPTER VII.

SYMPTOMS.

A VOLUME would scarcely suffice for the delineation of the symptoms of yellow fever, as it has presented itself in different years, from Key West, Galveston, and New Orleans, up to Vicksburg and Memphis. But such a volume, if written, could be of little practical utility, inasmuch as the modifications of different years appear to be without limitation, and those which the future may bring forth, will no doubt vary much from the past. This diversity, moreover, is not confined to the epidemic of different seasons

...ality are familiar with the symptoms of autumnal remittent and ...tent fever, with which yellow fever is supposed to have many close ...s and some identities, I shall frequently refer to them as terms of ...son. In those fevers we have a cold stage, a hot stage, and a secre... ...ge or intermission, which are separately described; so in yellow fever ...e three stages, which it will be convenient to consider separately ...he heads of *depression*, *reaction*, and *exhaustion*. The symptoms of ... former are most diversified, and at the same time most ambiguous ...pects the true character of the disease.

...E OF DEPRESSION.—The onset of yellow fever is in most cases sud... ...pared with autumnal fever. It may be made either in the day or ...ut appears to be oftener in the latter than in the former. In both ...n some epidemics, been observed to occur oftener in the after, than ...noon, and in the after, than in the fore part of the night; indicating ...tly the exciting influence of the opposite extremes of diurnal tem... ...e in awakening the fever.

...hill scarcely ever amounts to an ague, but is frequently protracted ...ral hours, alternating more or less with flashes of heat; in other ... is not only protracted, but as severe as in algid intermittent fever. ...e cases the patient complains of heat, when his skin is actually cold. ...mach is variously affected. The appetite may be lost or impaired ...y or two, but the instances are not few in which the disease has ...oon after a hearty meal. Although nausea and vomiting sometimes ... the chill for two or three days, they are not very common; and when ...g does occur, the yellow bile so often thrown up in the beginning of ...al fever is not often ejected in yellow fever, but in place of it a thin ... greenish fluid.

...tongue, sometimes, in the worst cases, is quite natural; in others is ...l with white or yellowish fur along the middle, and while its edges and

in the paroxysm; delirium sometimes occurs in this stage. Now and then the strength of the patient is greatly brought down; but in the majority of cases, the reduction of muscular force is much less than in autumnal fever, and a considerable number of patients keep on their feet throughout the whole of this stage, although a fatal disease may have set in.

The pain attendant on this stage, although less acute than in the next, and in some dangerous cases absent, is generally in the head, which then feels compressed; in the back, and in the limbs, and is often accompanied with yawning and a feeling of soreness in the muscles, and sometimes with spasms.

In some cases there is great epigastric and thoracic oppression, with an anxious aspect of countenance. In other instances the physiognomy is stolid, or that of inebriation; in all marked with indescribable peculiarities, which give important aid in diagnosis to those who have ever seen them.

The characteristic redness of the eyes often begins in this stage. The expression of the organ is dull and the pupil sometimes dilated, in other cases intolerant of light.

The intensity and duration of this stage vary exceedingly in different epidemics, and in different individuals during the fever. In many cases it terminates within a single hour—again it is protracted to twelve or even twenty-four, and in some instances, runs into the third stage, no reaction having taken place. Such cases present a marked resemblance to those malignant intermittents, in which the patient dies without the supervention of a hot stage; as the cases of short chill and early reaction, resemble the first paroxysm of simple or inflammatory remittents.

Stage of Reaction.—The transition from the stage of depression to that of excitement, of course, presents much diversity. In some it is sudden and decisive, evincing a marked inflammatory type; in others a part of the functions are restored, while others remain suspended, a certain indication of danger. On the accession of excitement, the stomach becomes more irritable, with increase of epigastric tenderness and a sense of heat in that region. Vomiting frequently happens, but the discharge of bile is limited, and in many cases none whatever appears. The thirst becomes intense, the redness of the tongue increases, the organ becomes narrower and more pointed, and the mouth drier. The bitter taste so often present in autumnal fever is not in general felt. The force of the heart increases, and the pulse, retaining its frequency, becomes tense and sometimes hard. In many instances, however, a greater fulness is the only change which this stage brings about, and in a few in which it was nearly natural in the preceding stage it continues so in this. The heat of the surface for the most part becomes intense, especially over the trunk of the body, which may happen while the feet continue cold. The pains now pass from dull to acute, and are often excruciating in the anterior part of the head, the orbits and balls of the eye, the back, and the limbs, especially the legs, the sur-

en participate in the pain of the orbits. The expression, although
mated than in the stage which has just passed away, is not that of
nce, but has been compared by nearly all our writers to the aspect
cation. As the disease advances, such parts of the conjunctiva as
ngorged begin to manifest a turbid yellow hue. In many instances
acteristic yellowness of the surface of the body, which gives name
ever, begins to manifest itself in this stage, and is more perceptible
ce than in other parts. In other cases it is deferred till the next
even till after death. The urine, secreted in sufficient quantities
beginning of the disease, now diminishes, and becoming higher
and sometimes irritating, often ceases to flow before this period ter-
The alvine discharges are feculent, more or less of a drab or gray
l sometimes tinged with yellow or dark-colored bile, but considera-
us evacuations do not occur.

uration of the second stage like that of the first is various. In very
very malignant cases, it may end in twenty-four hours; but is much
ontinued to forty-eight or seventy-two—rarely extending beyond
r. It is customary to speak of this as a single paroxysm; but
generally a slight abatement of the fever in the morning, which,
, increases in the course of the day, without the interposition of a
the signs of a recurring stage of depression, like that which ushered
ever. In some seasons and localities, however, a more decided re-
occurs, indicating, it would seem, the modifying influence of the
ause of autumnal fever.

E OF EXHAUSTION.—When the long paroxysm which has been
l comes to an end, recovery seems at hand. The pains and bounding
d burning heat have ceased, and the contrast of the present ease
preceding anguish, inspire both the patient and his friends with
hopes. The danger may or may not have passed away; and in the

ing characteristics of this fever, as compared not only with our ordinary autumnal fever, but every disease which prevails among us, we must now direct our attention.

The redness and altered expression of the eye are apt to continue in this stage. Sometimes the patient is delirious; in other cases his mental aberration inclines more to insanity, presenting an excited state of different feelings and passions, even the mirthful and lascivious. Again, he will be comatose, silent, and sullen. Although in some cases the exhaustion of muscular strength is extreme, in a greater number, there is unnatural strength, and a tendency to locomotion which the attendants can scarcely restrain. It is not uncommon for the patient to consider himself restored, or to see him attempting to engage in some kind of labor not an hour before his dissolution.

The heart does not regain its exhausted power, and its irritability in most cases is so reduced that it contracts less frequently than in health, giving a slow, soft, and sluggish pulse. The respiration becomes infrequent, slow, and stertorous. The skin shows inactivity of capillary circulation, assuming more or less of a livid hue, with ecchymoses or petechiæ; being either dry and cool, or bathed in cold perspiration. The functions of the liver and kidneys are not restored, but on the contrary, all appearance of bile in the stools is lost, and the suppression of urine becomes complete. The gastric irritability is often extreme, but in ejecting what is swallowed, it displays the phenomena of mixed hiccough and sudden eructation rather than vomiting. The sensation of nausea does not appear to be present. The yellowness of the surface, which may have begun in the previous stage, now deepens, or absent then, now appears; though in many cases it does not show itself till after death, when in all it becomes much deeper than before. But one of the most characteristic phenomena of this stage, sometimes commencing in the previous one, is hemorrhage, which takes place from nearly all the mucous membranes, as those of the mouth, navel, bowels, urethra, vagina, and sometimes the eyes and ears; it occurs from the scarifications of the cupper, from leech-bites, and from blistered surfaces. At length the fatal black vomit, the nature of which I shall hereafter consider, at once determines the true character of the disease and the probable fate of the patient.

In some cases, the matter thrown up has been a transparent or slightly turbid, watery, or thin mucous fluid, with flakes or shining plates, resembling fragments of the wings of black butterflies, floating in it; in others, a similar fluid has deposited an ash-colored sediment; in others, it has been sanguinolent; but in the majority, at the beginning, a dark-colored, flaky, or pulverulent matter, resembling coffee-grounds, swimming in a brownish-colored often viscid liquid, and constituting the true black vomit, precedes dissolution. The length of time before death takes place after this symptom supervenes is various. In some cases it proves the immediate precursor of dissolution; in others, the patient lives for two or three days, during which

r inflammatory character.

hen a typhous epidemic constitution is prevalent, yellow fever pre- its symptoms, a tendency the opposite of the last.

a highly malarial state of the atmosphere, it shows, in its milder a leaning to the type of simple autumnal remittent fever—in the olent, a simulation of congestive or malignant remittents, as has eady indicated.

hen epidemic cholera appeared in New Orleans, yellow fever was g, and soon put on so many symptoms of that disease, that many re only recognized as such by the fatal hemorrhage and black vomit oming stage.

tention to these and facts of a similar kind, is necessary to a recon- of the different histories of the disease; and the great diversities nent which physicians of equal skill and veracity have reported as l or prejudicial.

CHAPTER VIII.

PATHOLOGICAL ANATOMY.

ome now to inquire into the lesions of structure found after death ver which has been described. In doing this it will be impossible set them, severally, with the symptoms, as that can only be done istories of particular cases. Several of the *post-mortem* reports on must rely, were made from 20 to 25 years ago, when the true

sections of Dr. Cartwright were made at Natchez, in the epidemic of 1823, and 5; of Dr. Merrill, same place, 1823; of Dr. Ticknor, in Key West, 1824; of Dr. Lawrence and Dr. Harrison in New Orleans, at various times; of Dr. Ross, in Mobile, 1843; of Dr. Smith, in Galveston, 1839.

SECTION I.

SPECIAL LESIONS.

THE STOMACH.—Dr. Cartwright, 1823.* The mucous membrane violently inflamed throughout its whole extent in a few cases; in more, the lesion was limited to the greater curvature. In several cases in which the duodenum was violently inflamed, the stomach was entirely exempt from congestion, and its coats as firm and strong as usual. In a few cases the peritoneal covering over the lesser curvature showed signs of inflammation. There was generally an abundance of mucus. Black vomit was generally present either with or without vestiges of inflammation. In the epidemic of 1825, the same gentleman made a number of *post-mortem* inspections, and found no signs of inflammation in the majority.

At Key West, 1824, Dr. Ticknor,† in two cases in which the stomach contained black vomit, found the mucous membrane engorged, thickened, and softened, so that the slightest force would detach it.

Dr. Hulse, in dissections at various times, in the Naval Hospital, Pensacola, has observed the stomach to be contracted, its mucous coat corrugated, presenting sometimes dark, and other times rose-colored patches, while the large veins of the organ were filled with a black decomposed blood, and its cavity contained a fluid of nearly the same appearance.‡

In eight dissections at Galveston, 1839, Dr. Smith§ found black vomit and thickening and softening of the mucous membrane (always greatest near the pyloric extremity), which was sometimes injected, at others of a pearly white, anæmic.

In a great number of dissections, at various times, in the Charity Hospital and city of New Orleans, Dr. Harrison‖ found the mucous membrane of this organ finely injected with blood, even when examined almost immediately after death. He also observed, in some, pit-like holes and furrows. In some cases the hyperæmia was confined to the cardiac and pyloric extremities; in others, was general, and frequently extended to the submucous cellular tissue. In other cases the gastric membrane was entirely natural, but these were fewer in number. Softening was exceedingly rare. The organ generally contained black vomit, whether hyperæmia was present or not. In a few cases the membrane, after being washed, presented a marbled appearance, the consequence, as he believes, of the use of an acid

* Am. Med. Rec. vol. ix. † N. A. Med. and Surg. Jour. vol. iii.
‡ Maryl. Med. and Surg. Jour. vol. ii. § Account of the Yellow Fever. ‖ N. O. Med. Jour. vol. ii.

of the sulphate of quinine; as he found it practicable to produce pearance by immersing the membrane in such a solution.

Lawrance,* in New Orleans, in fourteen dissections, found the sto- xtensively inflamed in six; topically or in spots, in five; slightly in d uninflamed in one only. In six the inflammation ascended several into the œsophagus.

Slade,† in a single dissection at Vicksburg, found the mucous mem- niversally injected.

Ross,‡ in nine *post-mortem* inspections at the hospital, during the ic of Mobile, in 1843, found gas, black vomit, and a heavy coat of as mucus in almost every one. In one or two the mucous mem- nas extensively injected with blood, but in the majority red spots or only were seen, the general area being white and anæmic. Some- t was soft and tender, at others firm and apparently thicker than

Levert and Nott,§ of the same city, have in their occasional dissec- ound that membrane in a state of hyperæmia and softening, but ftener perfectly natural. They have seen it of a healthy, firm, and appearance, when great quantities of black vomit rested on it. They ver seen it either ulcerated or gangrenous.

Thomas,‖ of New Orleans, in the epidemic of 1822, in connexion with Martin and Dupuy, made ten dissections in the Charity Hospital, and the stomach inflamed in eight of them. In two, that organ was not ed. In some of them the cardiac portion was most engorged. In idemics of 1819 and 1820 he had observed the same condition.

Rushton, of New Orleans, in a considerable number of *post-mortem* nations, has generally found the mucous membrane thickened, d, and of a rose or deeper red color. Sometimes, however, to all ap- ce perfectly sound, and yet containing black vomit.

Mackie, of the same city, has in most cases found the gastric mem- injected, ecchymosed, thickened, softened, and sometimes ulcerated, ver gangrenous. When the discharge of black vomit has been copious, found the membrane blanched.

Stone, during a long residence in the Charity Hospital, made a great er of dissections. He found the stomach oftener affected than any organ, but in many cases it was entirely sound. The hyperæmia was ally in patches, and the membrane was frequently softened, especially *the examination was postponed.*

Kennedy, in the private hospital of which he is a proprietor, has ained, that in three-fourths of his cases the gastric membrane is ned, engorged, and sometimes ecchymosed.

E DUODENUM.—As the morbid appearances which are found in the

* Jour. Med. and Phys. Sci. vol. x. † MS. Mem. ‡ Ibid. § Ibid.
el sur la Fièvre Jaune.

duodenum, are substantially the same kind with those of the stomach, minuteness of detail will not here be necessary, and depending on the authorities already cited, I shall in the remainder of this chapter only refer to them by name.

Dr. Cartwright and his venerable friend Dr. Tooley,* found the ravages of violent inflammation much oftener in the duodenum than stomach; and in several subjects they were present in the former, while absent in the latter. The bowel was often lined with a thick layer of mucus and frequently contained black vomit, sometimes when the stomach did not. In two cases Dr. Ticknor found the same condition. Dr. Smith has sometimes seen this bowel of a deep brick-red, with prominent papillæ, giving it a granulated appearance; at other times natural in appearance, but distended with gas, and abounding in mucus and black vomit.

Dr. Lawrance, in the whole of his fourteen examinations, found the duodenum inflamed except in one.

Dr. Slade found it highly inflamed in his single dissection. Dr. Hulse has seen the veins of the peritoneal coat of this bowel distended with dark grumous blood, and the mucous membrane affected with rose-colored spots, at the same time containing black vomit. Dr. Harrison has observed hyperæmia of the bowel, and in other cases seen it quite natural. Dr. Smith has found the signs of duodenal disease uniformly less than of gastric. Dr. Stone has found this bowel as often affected as the stomach; Dr. Kennedy oftener. Dr. Ross has found it less affected than the stomach.

THE OTHER INTESTINES.—These often contain black vomit. They are sometimes more or less engorged, but on the whole less affected than the duodenum. Dr. Lawrance found the other small bowels inflamed in two-thirds of his cases, and the colon in about one-fifth. In one dissection Dr. Slade found the jejunum and lower part of the ileum decidedly inflamed. Dr. Kennedy has seen the glands of Peyer swollen and ulcerated, a condition which probably existed before the attack of fever, as its course is in general too short to admit of ulceration. Dr. Harrison, however, has noted the same thing as an occasional appearance. Extensive intussusceptions are occasionally encountered unattended, generally, however, with inflammation. A patient of Dr. Barton died of violent inflammation of the rectum, supposed, however, to have been occasioned by the irritation caused by the unauthorized and repeated use of the glyster pipe. Dr. Ross has seen their mucous membrane soft when it was not engorged. In most cases they contain a dark fluid, which is often blood but little changed. Dr. Smith has noticed, in several cases, a tumefaction of the glands of Peyer; he has seen patches of hyperæmia in various places. Black vomit was common. In one case the colon was remarkably white and contracted.

THE LIVER, GALL-BLADDER, AND BILE.—Dr. Cartwright found the liver in most of his dissections somewhat enlarged. It was generally of a

* Heal. Yellow Fever in New Orleans, 1823.

enish hue, and in one or two cases black. In every instance the portal sels were engorged with black blood. The serous membrane on its pos-ior surface, and the cellular substance investing the great vessels of that ghborhood, were always more or less inflamed. The gall-bladder always tained a black, ropy bile, and in one case its parietes were black but not rtified. The efferent ducts were generally in a natural state. In all es Dr. Smith observed a deficiency of bile, but in none any structural angement of the liver. Dr. Hulse has generally found the liver pale, ugh sometimes presenting livid patches; when cut into, black dirty-king fluid blood gushed out in large quantities. Dr. Harrison has not n any lesion of this organ which he could attribute to the fever. In ne subjects it contained less blood than usual, and was of course pale and ,—in other subjects it was engorged and bled freely when cut. In cases ich had been treated by copious bloodletting it was generally of a pale low. In most cases the gall-bladder has contained its usual quantity of lthy bile; but in a few, that fluid was replaced with a little glairy cus. He has seen the mucous lining of the cyst injected in spots h blood, but in most instances it was healthy. Drs. Levert, Nott, and Nelly have not observed any particular morbid appearance. Sometimes it a little yellower and larger than usual. The gall-bladder is often dis-ded with dark viscid bile which by dilution assumed a yellow hue. Dr. ns has generally found the liver much altered, of a dark blue, a brown d a lemon color; almost always softened and affording a large quantity f blood. In one case soft and dry. The gall-bladder has generally con-ined a quantity of thick, blackish, or dark green bile. In one case he found its parietes much thickened. Dr. Rushton has seen the liver yellow in all cases in which the skin assumed that hue, but is not aware of any structural lesion; and like all the observers named has never seen it in a state of suppuration. Dr. Mackie has commonly found the organ of an olive hue, its texture firm, but its vessels engorged with blood, except when copious hemorrhage had preceded death. Dr. Stone has often seen it pale or nearly natural, in a few cases engorged. Dr. Kennedy has in most in-stances found it normal, except that its color has been that of the skin, and the gall-bladder oftener empty than full.

Out of fourteen cases Dr. Lawrance found the liver pale, or ash-colored in seven, in several of which it had the appearance of being parboiled. In two it was dark or brown. In three it was natural in color. In the other two the color was not noted. In one case he found it unnaturally small, in another too large. A single case only is noted of sanguineous engorgement. One as being hard and one soft. In almost every case the pori biliarii and hepatic ducts, were destitute of bile or contained a small quantity, generally of a very pale or dark and dirty hue.

The gall-bladder in one case only was filled with healthy bile—in one

with transparent mucus. In general it contained a small but variable quantity of dark greenish or yellowish fluid.

Dr. Slade's patient had a liver of a light drab color, and destitute of blood except in the larger vessels. The ducts were nearly destitute of bile and the gall-bladder contained but a small quantity, which was dark and tenacious.

THE SPLEEN.—Dr. Cartwright generally found this organ somewhat enlarged, when the stomach was not inflamed. In a case which had been preceded by intermittent fever, it was so tender as to fall to pieces on being handled. The cellular membrane connecting the organ with the stomach and pancreas was generally in a state of congestion. In one case of two, Dr. Ticknor found the spleen enlarged, but not otherwise altered. Dr. Harrison has generally observed it sound—now and then engorged with blood. In one case out of several, Dr. Thomas witnessed enlargement. Dr. Smith in almost every dissection found it natural. Dr. Rushton has seldom seen it engorged—generally normal. Dr. Stone and Dr. Kennedy have in most cases found it natural; on the contrary, Dr. Ross has frequently seen it engorged, enlarged, softened, and almost diffluent, though sometimes normal. Dr. Lawrance found the spleen in two of his cases large, blue, and tender.

The conclusion of Louis, from dissections made at Gibraltar in 1828, that the true anatomical character of yellow fever is to be found in the color of the liver, having been adopted by some of our physicians, I have thought it worth while to bring it to the test of our own *post-mortem* examinations. According to that distinguished pathologist, the organ is "Sometimes of the color of fresh butter, sometimes of straw color, sometimes of the color of coffee and milk, sometimes of a yellowish-green color, or a mustard color, or finally, sometimes an orange or pistachio color."* This discoloration he regards as characteristic of yellow fever. His generalization was founded on twenty-three dissections. For the purpose of comparison, I have carefully analyzed thirty-eight cases, the details of which have been reported by Lawrance, Cartwright, Smith, Ross, Barrington, Ticknor, Barton, and Slade, chiefly the first four, and here are the results: natural, 6; green and greenish, 5; natural, dappled with drab, 4; drab, 3; light, 3; pale, 3; pale ash, 2; black and dark, 2, reddish-brown and brownish, 2; dark blue, 2; lemon, 2; mahogany, 1; sole-leather, 1; fawn, 1; chocolate, 1.

With these facts before us, it is impossible to admit that the true and universal anatomical character of yellow fever is to be found in a discoloration of the liver, much less in any particular hue. Louis has added to this discoloration a dry and anæmic state of the organ, which, however, he did not find as uniformly as the discoloration. This condition existed in a number of the cases we are now examining, but in many others, the organ

* Anatomical, Pathological, and Therapeutical Researches on the Yellow Fever of Gibraltar. Shattuck's Trans. p. 117.

gorged with blood, and, therefore, we cannot admit dryness as a true ariable characteristic of the fever. It is not difficult to understand liver should present a great variety of hues. The delicate coloring of the bile is no doubt susceptible of many changes of tint under uence of agents or mordants developed in the blood or the secretions the fever; and as to the anæmic or hyperæmic condition of the t may often perhaps depend on the extent of the hemorrhages into nach and bowels before death [or excessive depletion during life.

e remarkable contrarieties have no doubt resulted, in part at least, evious attacks of intermittent fever in some of the patients.

PANCREAS, mentioned by a few observers only, has been noted as except in three of Dr. Lawrance's dissections, in which it was large cular, and bloody water was infiltrated into its substance in one.

MESENTERIC GANGLIA.—Dr. Harrison, and a few other observers, oticed enlargement of these ganglia, especially in cases that termi- ter the seventh or eighth day. Dr. Lawrance saw a case in which entery presented extravasated, bloody-looking fluid in its cellular

KIDNEYS, BLADDER, AND URINE.—According to Dr. Cartwright, ose substance in which these organs are imbedded, was nearly always rlet hue, which was more developed in proportion as the suppression e had been more complete. In a few cases the cortical portion ex- appearances almost gangrenous. On cutting and squeezing the grumous blood issued from the tubuli uriniferi. The bladder was nes thickened in its parietes, and contained a small quantity of red- tid urine. On the other hand, Dr. Smith found the kidneys sound y case. The bladder was generally empty and contracted, but in one found it nearly full of limpid urine. In another, the quantity was , with flakes of white mucus, and the entire internal coat was gorged lood, giving it the appearance of the lining membrane of the eyelids unctivitis. In a single subject, immediately below, and rather behind neys, near the spine, on each side, there was a clot of blood in the r tissue, three inches long and half as much in width. Dr. Harrison erally observed the kidneys to contain a great deal of blood, but on into them, he could seldom find any appreciable lesion of structure. e cases, the lining membrane of the pelvis was spotted with blood, earance which the bladder occasionally offered. Dr. Ross, in almost dissections, found these organs in a diseased state; frequently en- engorged with blood of a dark red or brown color, sometimes, how- naturally pale, often dry, generally softened, but sometimes unu- firm. The bladder generally contained a notable quantity of urine, was in most instances of a healthy quality.

M'Nelly, of Mobile, has often seen the bladder distended after death,

especially in those who live for sometime after the setting in of the third stage.

Dr. Lawrance, in three out of fourteen dissections, found the kidneys highly vascular, red, and tender. In another, there were coagulated extravasations into their substance and pelvis. In another, extravasations of blood around them; in another, they were of a blue color. In one case he found no urine; in another, a moderate quantity, of a yellowish hue; in another, the bladder distended with the same, and in another, it was distended with a bloody fluid.

THE PERITONEUM appears to have been healthy, except the duplicatures forming the omentum, which a few of the observers note as being in a state of hyperæmia; and Dr. Lawrance found in one case a considerable quantity of bloody serum in the cavity.

Let us now ascend to the chest, beginning with

THE LUNGS.—Dr. Cartwright informs us that in some cases a considerable portion of the lungs resembled the liver both in weight and appearance. Under pressure after cutting into them a frothy liquid was discharged. In one or two of Dr. Ross's cases, these organs were engorged with blood—in all the rest, they seem to have been in a normal condition. Dr. Hulse found them abundant in dark-colored blood, with spots of the same hue on their surface. Dr. Smith found them, generally, normal. Dr. Harrison the same, though he has met with cases in which they were engorged, and did not collapse as usual. In a single instance he found a coagulum of extravasated blood. In a number of cases the mucous membrane of the bronchi and trachea was finely injected. Dr. Lawrance in his fourteen cases noted the lungs as sound and natural in one-half, engorged more or less with blood in five; of two nothing is said. In one case there were several ounces of yellowish fluid in the chest, although the lungs were healthy—in another, in which they were engorged. there was a considerable quantity of bloody fluid.

THE PLEURA appears not to have been found inflamed. In a few cases it contained more serum than usual.

THE HEART.—In a great majority of Dr. Cartwright's cases, the cavities of the heart contained polypi or fibrinous concretions, which sometimes were so large or numerous as actually to distend the organ. In their substance were cells filled with yellow serum. At other times the organ contained a considerable quantity of blood resembling molasses in color and consistency, an abundance of which was likewise contained in the venæ cavæ near the heart. In several subjects spots an inch in diameter, the product apparently of inflammation, were found on the outer surface of the organ. Dr. Harrison informs us that coagula (polypi) are generally found in the heart, and contain an unusual quantity of coloring matter. In several subjects the endocardium presented spots analogous to the petechiæ of the skin. Dr. Smith found the heart sound. Sometimes there was an

unusual quantity of yellowish serum in the pericardium. Dr. Ross generally found the heart normal. In one or two subjects its parietes were softened, but as they were also dilated, the whole probably existed before the fever set in. In one case the pericardium adhered, but we are not told whether by new or old lymph. Drs. Levert and Nott have occasionally seen the heart softened. In fourteen dissections Dr. Lawrance found the heart tender and easily torn in one, and its cavities very turgid with blood in two; in the others it was either natural or not reported. In a case in which there was effusion of yellow fluid into the cavity of the pleura, there was also the same into the pericardium.

We come now to the nervous system, beginning with

The Brain.—According to Dr. Cartwright, the pia mater and arachnoid were in all his subjects except one more or less inflamed throughout their whole extent. The same was true of the velum interpositum and pia mater, the latter exhibiting a scarlet tint. In most cases the lateral ventricles contained a quantity of yellow serum, and in one eight ounces of such serum were found effused upon the surface of the brain, the membranes at the same time showing marks of inflammation. The fibrous membranes of the brain and cranium, within and without, showed no signs of inflammation, only bloody dots or points. The pia mater, especially about the tuber annulare, was almost always inflamed in those who had been delirious. Dr. Harrison has sometimes seen the pia mater finely injected. Occasionally the dura mater presented the sanguineous dots just mentioned. A moderate quantity of serum on the surface or in the ventricles of the organ was not uncommon. In some subjects the substance of the organ was engorged with blood, but generally it presented no appreciable lesion. Dr. Stone has often examined the brain. In a number of cases he met with venous engorgement; in a few, traces of coagulable lymph; but on the whole but little alteration. In one dissection Dr. Thomas found the membranes of the brain, particularly the plexus choroides, engorged with blood, and a considerable extravasation of black blood in the ventricles. Dr. Ross did not examine the brain. Of his fourteen cases Dr. Lawrance has reported the condition of the brain in only six. In one of these it was much engorged, in two others the vessels of its exterior were greatly distended with venous blood; in one the plexus choroides was highly injected, and of a deep red; in two there was serous effusion into the ventricles. In one of the cases in which the external vessels were engorged, the corpus callosum was of a bluish color and in common with the whole brain had a peculiar putrid odor, though the examination was made only twelve hours after death.

The Spinal Cord.—In four examinations Dr. Cartwright found the fibrous investment free from disease. In the whole of the same subjects the arachnoid and pia mater were inflamed, chiefly in the lumbar and sacral portions, but less intensely than within the cavity of the skull.

There was frequently a scarlet hue about the origins of the nerves, both of the spinal cord and the medulla oblongata. In one subject there was a large quantity of yellow serum in the cervical portion of the theca. Dr. Harrison has not detected any affection of the membranes of the spinal cord. Dr. Thomas, on the contrary, who did not generally examine the brain, but directed his researches carefully upon the cord, found its serous membranes, in almost every case, displaying marks of inflammation, leading him to think that this condition always exists in yellow fever. Dr. Ross did not examine this organ, which appears to have been generally neglected in yellow fever dissections.

THE GANGLIONS AND PLEXUSES OF THE GREAT SYMPATHETIC.—Dr. Cartwright is the author to whom we are indebted for all that can be said on this subject. In his account of the Natchez epidemic of 1823, after expressing dissatisfaction with the result of his examination of the abdominal viscera, as not illustrating the pathology of the fever, he observes: "I at length determined, if possible, to find out the nature and seat of the malady, not only by examining the abdominal viscera, but the brain, the spinal marrow, and every part of the system. It was then that I *discovered* the diseased state of the *ganglions, the ganglionary nerves, and the inflammation of their investing membranes.* The semilunar ganglions, and cœliac plexus, were, in particular, highly diseased. The membranes immediately investing these ganglions and their plexuses, were of a deep *scarlet*, and in some places, of a *black* color. This inflammation was not confined to the tissues immediately investing the nerves, but extended to the neighboring tissues, especially of the semilunar ganglion. The whole of the membranes enclosing the nerves, denominated the solar plexus, lying upon the cœliac and superior mesenteric arteries, were black with inflammation. The cellular substance investing the hepatic plexus, as it extends on the hepatic artery and vena portarum, the splenic, the mesenteric, and renal plexuses, together with the cardiac and *pulmonary plexuses*, were found to be of a scarlet color. In a word, the delicate tissues investing the whole of the ganglionic system of nerves, were more or less inflamed. Of twenty subjects, in the yellow fever of Natchez, in 1823, the ganglionic system of nerves were minutely and closely examined in seventeen; in the other three they were not. In these seventeen subjects, there was not a case in which the investing membranes of the ganglions and their plexuses were not highly inflamed. In all these examinations after death, notes were taken at the time they were made, and many of them were witnessed by Drs. Gustine, Denny, and Tooley. A very good view of the tissues, which were always found inflamed in yellow fever, and which were more highly so than any other tissues in the whole system, could be had by taking out the thoracic and abdominal viscera entire, together with the aorta, and turning their posterior part uppermost. The membranes behind the great vessels of the lungs, enveloping the posterior pulmonary plexus, and the membranes on the anterior

f the aorta, down to its bifurcation, but particularly those about the f the cœliac artery, investing the semilunar ganglions and their es, were always of a deep scarlet or black color, which, like the roduced by indelible ink, defied ablution. The appendix of the dia- n was also, in the most of cases, very much diseased.

n looking into the subject after the viscera were removed, the whole substance of the psoas muscles was generally found to have undergone a hange of state, from its healthy condition. In some cases, these mus- re of a black color, and easily torn. The fleshy part of the iliacus inter- here it arises from the transverse process of the last lumbar vertebræ, om the hollow of the ilium, was diseased in common with the psoas s.

sides these dissections in the yellow fever of Natchez in 1823, I made mination of a patient who had died of the yellow fever of New Or- n 1824, and also a sporadic case of the disease in Natchez, since 1823. unt, of Natchez, assisted me in the examination of the latter. In both ases, the ganglionic system of nerves was found to be diseased in the anner as in the seventeen cases in which these nerves were examined 3."—[Extracted by Editor.*]

ll the published accounts which I have been able to collect, I find reference to the condition of these portions of the nervous system, is by Dr. Harrison, who has generally found in them "no appreciable " Dr. Stone informed me that he had several times examined the lexus and semilunar ganglions, without realizing Dr. Cartwright's eries, having not found in them any particular departure from a y condition.

Muscles of Animal Life.—Several of the Mobile physicians bserved that the muscles appeared to be a little softened, and do not e as rigid as after death from common causes. Dr. Lawrance men- two cases in which the muscles of the limbs or trunk, were soft, ten- nd full of blood. Dr. Smith, however, speaks of the limbs as being and others are silent.

Skin.—Generally of a sallow hue, especially over the face, neck, and , before death. The skin becomes, afterwards, in most subjects, uni- ly yellow. In a few, this complexion is modified by a leaden, or a nd dirty hue. Petechial spots are often scattered over this ground. awrance has observed that the scalp abounds in blood, which is some- extravasated into, or beneath, as it is found in patches occasionally here.

* American Med. Recorder, vol. ix. p. 37.

SECTION II.

GENERALIZATIONS.

I. Most of the morbid appearances set forth in the preceding section, are hyperæmias or congestions of blood, sometimes arterial sometimes venous. In many cases, no doubt, there were actual inflammations; but we are scarcely at liberty to regard the appearances observed as entirely due to that lesion, for mere hyperæmia cannot be regarded as proof of inflammation. 1. We are not told by most of the observers that the blood of the reddened tissues could neither be pressed out nor washed away; and nothing indicates that any allowance was made for *post-mortem* accumulations. These negative facts would not, however, be worthy of attention but for the following, which although likewise negative, are entitled to consideration. 2. The softening of the tissues, although frequently mentioned, does not seem to have been commensurate with the hyperæmias. 3. The effusions, serous and lymphatic, attendant on that mode of morbid action, have generally been wanting. Indeed examples of lymphatic effusion are scarcely to be met with. 4. We have not a single instance of suppuration. 5. Scarcely an instance of ulceration is mentioned. 6. Not a single case of gangrene has been offered to our notice. 7. Hemorrhage, which is so seldom associated with inflammation, has been frequent. These hemorrhages have often been in stellated spots into the cellular tissue of the organs or skin. When such spots have been found in the midst of an extended hyperæmia, they have been regarded as signs or effects of inflammation, but as they have often occurred in the same subjects where there was no inflammatory congestion, as in the skin, for example, we cannot admit them as unequivocal signs of inflammation when found in the internal tissues. 8. The greater number of observers have reported the blood drawn in yellow fever as destitute of a sizy crust. 9. It is unquestionable, as we shall hereafter see, that yellow fever has often been aggravated by copious bleeding, and cured by means not adapted to the removal of inflammation. 10. The number or extent of these hyperæmias in the same subject is certainly not favorable to the theory of inflammation.

In view of these facts, we must, I think, regard many of the reported vestiges of inflammation as simple congestions.

II. In referring to the relative frequency of these in the different organs, we must admit the greatest number in the stomach and duodenum; though they are not uniformly met with in either. When present in one, they have been absent from the other, *et vice versa*; but in many cases they have occurred in both. Of the other intestines, the smaller have been oftener affected than the larger. Dr. Lawrance only has mentioned inflammation of the œsophagus.

III. The liver appears to have suffered but little, at least from any kind vascular engorgement; though in most cases, its secretory function has en greatly impaired; in some quite suspended. Its efferent tubes have en unobstructed, and still they have not poured out bile, nor did they ntain that fluid in the usual quantity. It appears conclusively, then, at the yellowness of the skin, and sometimes of other tissues and of reted fluids, is not owing to the resorption of bile, elaborated in the er, but to a suspended action of that organ, and the development in the od, of the coloring matter, and, perhaps, other proximate elements of t fluid; a process which continues after death, to the production in many es of a deep, universal *post-mortem* jaundice. Thus the biliary derange- nt is peculiar. The production of the elements of the bile continues, perhaps increased, but the liver has lost its ability to combine and ex- te them; an impairment of function which, as far as pathological ana- y teaches, does not depend on inflammation of that organ.

IV. The spleen is but little affected in yellow fever, even less than in phus and typhoid fevers, incomparably less than in autumnal intermit- nts and remittents. Dr. Ross found it oftener disordered than any other server; but intermittents are common in and around Mobile, where his servations were made.

V. The morbid appearances in other portions of the digestive organs ve been still rarer, and, as it were, more accidental than those of the rgan just mentioned. Of peritonitis, either abdominal or visceral, the stiges have been exceedingly slight.

VI. The kidneys and their cellular and adipose beds have felt the force f the disease, but not in a majority of cases, nor always in the form of in- mmation—sometimes in that of hemorrhage. Like the liver, they have frequently failed in their specific function, but the suspended evacuation of rine has much oftener arisen from retention in the bladder than is gene- lly supposed. In many cases, that organ has lost its power of contraction before the kidneys have lost the power of secretion, and hence the bladder as been found distended, not however, with healthy urine.

VII. The morbid appearances within the chest have not been so constant, extensive, or well-defined as to constitute an important anatomical character, nd cannot, indeed, be regarded as denoting anything more than incidental ffections, seldom of a true inflammatory kind.

VIII. The brain and its membranes have been oftener the seat of ana- tomical lesion than the heart and lungs, or even the liver; but effusions of lymph have been seldom seen, which, considering the great extent of serous membrane within the cranium, seems to indicate that the morbid action has not always been inflammatory. On the other hand, extravasations of blood nd serum have occurred, and on the whole, we may conclude that the affection of this organ has frequently been that of non-inflammatory san- guineous engorgement. In many cases it seems to have been but little

affected; we may, at least, without hesitation, believe that yellow fever may run its course to a fatal termination without leaving any appreciable lesion of that organ.

The examinations into the condition of the spinal cord have been comparatively few. Its lesions appear to resemble those of the brain.

IX. The reports by Dr. Cartwright on the morbid condition of the ganglia and plexus of the great sympathetic, stand unsupported by those of other observers. It is not likely that such important lesions should have been overlooked for twenty years. We must, I think, believe that the appearances observed by Dr. Cartwright belonged more especially to the epidemics in which he practised, and are not an invariable anatomical character.

X. It results from all that has been said, that as yet no special, invariable, and universal lesion of structure, characteristic of our yellow fever, has been discovered; but that vascular derangements of gastro-enteric mucous membrane are most frequent.

Let us now turn our attention from the distribution to the condition of the blood.

SECTION III.

LESIONS OF THE BLOOD.

To ascertain the state of the blood in reference to its fibrine during the stage in which venesection is employed, I have carefully examined more than twenty original published accounts of the fever in various localities, from Key West and Vera Cruz in the South, to Natchez and Rodney in the North, extending through a period of thirty years. Many of them are by physicians who made a liberal use of the lancet, but almost all are silent as to this appearance of the blood, while many declare that it is not sizy.

We are not at liberty to suppose that if the blood has generally been so, the advocates for venesection would have failed to mention it.

On the whole, then, we may conclude, as a true and permanent fact, that yellow fever does not in general generate sizy blood, in other words does not, like the phlegmasiæ, *increase* the fibrinous element, and that a buffy coat is a rare exception [and probably due to incidental inflammation.—ED.]

But we cannot stop at this point. There is much reason for believing that the quantity of fibrine is *diminished*, even before the disease has reached its third stage, when no pathologist can doubt its impoverishment in respect of that element. The late Dr. Dodd* expressly says that this is the case, and Dr. Hulse† affirms the same thing; which is still further manifested by the slowness of coagulation, the softness of the clot, and the early hemorrhagic tendency, facts which are avouched by the majority of those who have spoken of the condition of the blood.

* Western Jour. of the Med. and Phys. Soc. (Cincinnati) vol. v.
† Maryl. Med. and Surg. Jour. vol. ii.

As a further change in the constitution of the blood, Dr. Dodd and Dr. ulse, confirming the observation of Dr. Stevens, affirm that this fluid is ficient in saline ingredients, to which deficiency its dark color is in part at ast to be ascribed. I was assured many years since by the former of these ntlemen, that he had verified this fact by experiments, which however are t published in the paper to which I have referred.

If such be the condition of the blood in the earlier stages of the fever must be aggravated in the latter; when its coagulability is nearly stroyed, and its color often a deep black.

Hemorrhages.—To this condition of the blood, taken in connection with certain degree of softening and relaxation of the solids, of which *post-ortem* inspections assure us, we may ascribe the hemorrhages so often pre-nt in this fever. They are what the theory of a loss of fibrine would lead s to expect, and may therefore logically be cited as proofs of the correctness the doctrine. In the stage of excitement they would not occur if the dis-se were a true phlegmasia, for then the congestions would be of a real flammatory character, and the abundance of fibrine consequent on the dis-se would prevent extravasation. These early hemorrhages, in fact, at once dicate a diminution of that element, and the absence of true inflammation the tissues which are engorged, and which are relieved by the flow of lood. In these cases, vascular congestion and the *vis-à-tergo* of the heart, ay be regarded as the exciting causes; a deficiency of fibrine as the pre-disposing cause of the extravasation. In the more advanced stages, the ndition of the blood, and the incipient decomposition of the tissues, are the combined causes of the general and copious discharges of black blood; which may sometimes give topical relief, but are the signs of serious lesion, in both the solids and fluids.

Black Vomit.—What has been stated relative to the pathological tnatomy of the liver, with its gall-bladder and efferent ducts, demonstrates what has been long believed, that the peculiar fluid called black vomit, is not a secretion from that organ, nor an altered state of the bile. It is in fact but altered blood, and would have no existence, but for the hemorrhages which have been described. Its well-known seat is the stomach and small intestines, but especially the former. Of its appearance, Dr. Harrison* gives us the following account:—

"One of the most striking traits of yellow fever is the occurrence of black vomit. It has been correctly described as resembling coffee-grounds in a thin solution of gum Arabic, or infusion of flax-seed. But it varies greatly as to color. Sometimes we can see but a few striæ mixed with the flocculent gray matter already spoken of. These striæ are most apt to be found on the sides of the basin. In an hour or so, the fluid ejected from the stomach becomes darker, on account of their increase. Sometimes, instead of the coffee-grounds

* New Orleans Medical Journal, vol. ii. p. 147.

appearance, the fluid thrown up approaches in color that of venous blood. In some cases, the vomit can be distinguished in nothing from blood in an uncoagulated, dissolved state. In short, between decidedly-formed black vomit and blood, there are numberless shades; they run into each other by imperceptible degrees, and the distinctions that have been made by some authors in the appearances of the matter ejected from the stomach are altogether artificial.

"In the quantity thrown up, there is also great difference in different cases. Some throw up enormous quantities; others die after having ejected but a few strise."

This description corresponds with those given me by many other physicians. It is composed, Dr. Harrison adds, "of solid particles held in suspension by the liquid, since they may be separated by filtration."

It is a well-known fact, that black vomit may be closely imitated by adding muriatic acid and mucilage of gum Arabic to common blood. Dr. Harrison has published the details of an experiment of this kind, and numerous physicians have given me unpublished statements of the same sort.

The elements of the black vomit of yellow fever, then, are blood and the acid secretions of the stomach. To the formation of the compound, the loss of the saline ingredients of the blood may, negatively, contribute, by favoring a higher degree of acidity in the gastric juice; and hence may perhaps be explained the fatal indication afforded by the ejection of this fluid. It is a sign that the blood is in such a condition as will probably be followed by death. It is uncertain whether the blood is acted upon by the acid agent in the parietes or in the cavity of the stomach. The coagulating quality of rennet, or the dried stomach of the calf, when steeped in milk, would favor the opinion that the blood of the stomach may be changed into black vomit as it passes through the parietes of the organ: if not, the mingling and change take place in its cavity.

In whichever of these two modes the combination takes place, black vomit may be regarded as a melanotic fluid, identical (when we allow for the previous changes in the blood), with the products obtained by Dr. Carswell,* in his interesting experiments on the influence of the gastric juice on blood.

Some of our physicians have seen a fluid resembling black vomit discharged from the bladder. May not a superabundant acid, lithic, purpuric, or lactic, have in these cases been secreted by the kidneys, and served as one of the elements of the black discharge?

* Elementary Forms of Disease. Also, Cyclopædia of Practical Medicine, Art. Melanosis.

CHAPTER IX.

PATHOLOGY.

After the ample detail of pathological facts in the preceding chapter, I do not propose to devote much time to pathological speculations.

1. The definite character of the symptoms, stages, and lesions of yellow fever prove it a specific disease, which extends to the functions generally, and leaves its vestiges, unequally, in all the organs; it is therefore the product of a particular remote cause.

2. On what part of the body this cause exerts itself is unknown. If not absorbed into the blood by the skin or lungs, its impress must be made on one or both of those tissues. If absorbed, it may modify the constitution of the blood, and at the same time, make a morbid impression on the internal parietes of the vessels. In either case, it acts like every other agent, in virtue of a vital susceptibility in the tissues, and transforms their functions from a normal to an abnormal condition, which manifests itself by the phenomena of the forming or first stage of the fever. If we interrogate these, to learn which organ is first affected, we obtain no satisfactory answer; for while one seems to take precedence, in this case, another has that undesirable eminence in that, and another still in a third. In fact the perversion or disturbance of the functions is as extensive, and, relatively to each other, as great in the first, as the last stage of the disease, in many cases greater. It is impossible, then, to assign a particular organ, in which the primary morbid action is originated, and whence it is radiated sympathetically throughout the system; indeed many of our physicians have observed that the organs, in certain very dangerous cases, do not seem to sympathize with each other, a fact which of itself indicates a constitutional lesion, for the sufferings of an organ would of necessity be felt by others, if the disease were local, that is, if the function of association on which all sympathy depends were not already impaired.

3. This constitutional lesion—this perturbation of the organism (disturbance of the functions), generally constitutes the fever, the type of which is expressed by the symptoms, while its effects are displayed in the anatomical derangements, solid and fluid, which have been presented. Both the symptoms and the lesions of structure demonstrate, that while the whole body is invaded, all parts are not equally affected; nor is the mode of affection the same in all. Let us devote a moment to this diversity.

4. In some cases the enervating impress of the remote cause is so decisive, that no effective reaction takes place, and the forming and closing stages are brought into immediate sequence, the lesions of the third stage being formed without the intervention of the excitement which characterizes

the second, though not without the visceral congestions, which are inseparable from the disease.

5. In other cases this reaction is prompt and so intense as not only to exhaust the vital forces, and thus at length leave the patient in a state of hopeless exhaustion, but to convert the simple congestions of the tissues into secondary or consequential inflammations, productive of lesions of structure not essentially different perhaps from those of primary inflammation. To these congestions, and the powerful action of the heart, we may in part ascribe the hemorrhages of this stage. The danger from these congestions, when they are equal in degree, is of course greater in proportion as the organ or tissue in which they are seated, is of more commanding importance in the economy. Those of the stomach, duodenum, brain, spinal cord, and great sympathetic, are most to be dreaded.

6. The special function of the liver is impaired or suspended, whereby the elements of the bile, abundant in quantity from the influence of the preceding heat of summer, are chiefly retained in the blood, to color the tissues, and still further to deteriorate their functions. This impairment generally exists from the beginning.

7. At a later period, the kidneys fail, and the fate of the patient is often hastened by the retention in the blood of the elements of their excretion.

8. A suspended state of the cutaneous secretion contributes though in a lesser degree to the same result. The favorable termination of cases in which the functions of the skin are not deeply impaired, must not be ascribed to that condition, which is but a sign of a milder disease, or at most an evidence that the blood of the body has a greater exterior flow, and consequently the internal hyperæmias are less.

9. But it is not to the vital properties of the solids, their state of cohesion, the congestions which form in them, nor the retention of the elements of the excretions in the blood, alone or combined, that we must look for the whole danger, but add to them the deteriorated condition of the blood itself.

In the present state of our knowledge of the mysterious relations between the blood and the solids which it penetrates, it would be futile to attempt a decision of the question which is first affected in this fever. Although some of our physicians believe with Dr. Stevens, that the lesion of composition in that fluid precedes the lesions of the functions of the solids, the suddenness of the attack in many instances serves to indicate that the latter are primarily affected. However this may be, and whatever part a deterioration of the blood may play in the beginning and early periods of the fever, there can be no doubt of its sinister influences in the more advanced stages.

First. Its reaction on the solids cannot be otherwise than pernicious. When the high febrile excitement of the second stage has subsided, one cause of exhaustion and death may be the contact of this blood with the

solids, throughout all the vital organs where it stagnates or circulates languidly.

Second. Its condition is unfavorable to a restoration of the secretions to a healthy condition.

Third. As we have already seen, it favors those passive hemorrhages, which when they take place into the tissues, tend still further to their decomposition; and when they occur on the tegumentary surfaces increase the exhaustion and collapse.

CHAPTER X.

TREATMENT.

SECTION I.

SELF-LIMITATION—PREVENTION.

Self-Limitation.—Under every variety of treatment or no treatment, the febrile excitement in yellow fever, has a *quasi* definite duration. It cannot in this respect be put in the same level with the hot stage of eruptive fever in small-pox and measles; but once established, no method hitherto pursued has been found to arrest it, though it may be moderated. On the other hand, under every method, and in the absence of all treatment, it will not run beyond three or four days, when it is succeeded by the third stage. The exceptions to this remark are but few, and depend in all probability, upon the decisive establishment and reactive influence of inflammation in some important organ; constituting a case analogous to that of the conversion of an intermittent into a remittent or continued fever, from some incidental visceral inflammation. It appears then that a character of *self-limitation* belongs to yellow fever, and of course many cases would terminate favorably if nothing were done, as others end fatally under the most vigorous treatment; all of which is also eminently true of scarlatina. Of such a disease it may be said that the object is more the preservation of life than the arrest or cure of the fever.

In this (imperfect) principle of self-limitation, we may, perhaps, find one of the sources of that variety in the treatment of yellow fever, which its therapeutic history presents—methods, in some degree, the most opposite, being equally lauded for their efficacy, when in fact the disease expired by its own limitation.

Prevention.—This subject is not unconnected with the last. If yellow fever have a self-limited character, can it be prevented in those who are ex-

posed to its remote cause? I would say, that the possibility of successful prevention is inversely to the character of self-limitation, and therefore, that although more may be done to avert attacks of yellow fever than small-pox, still the prophylaxis of the disease is by no means very practicable; and experience, in this case, verifies the decisions of theory. In certain seasons, emigrants from the North will enjoy an exemption from the fever in Mobile and New Orleans, without observing any particular course of regimen, or resorting to medicines of any kind, but the next year when the disease happens to prevail, they may be attacked, notwithstanding every precaution. It is true, as we have already seen, when speaking of exciting causes, that some one of them seems, in many instances, to have invited the attack, and they ought to be carefully avoided, but it is equally true, that attacks are incessantly experienced, notwithstanding such avoidance. In short, no immigrant from a higher latitude can hope to escape an attack, although it may not always happen in the first epidemic he encounters. Uncertain, however, as all known means of prevention may be, it is proper to enumerate them. They are as follows:—

1st. Avoid carefully every exciting cause. 2d. Let the plethoric occasionally lose blood, especially under any sense of fulness or pain in the head. 3d. Keep the bowels regular with mild mercurial laxatives. 4th. Under any feeling of indisposition, let the patient lie by, and after proper alvine evacuation, promote the functions of the skin with alkaline diaphoretics and diluents.

SECTION II.

REMEDIES FOR THE FIRST AND SECOND STAGES.

DIVERSITIES AND CONTRADICTIONS.—It would require a volume to present all the methods of treatment which the physicians in different places and seasons have pursued in this fever, a sufficient proof that it is not decidedly under the control of any. This untractableness is, then, one source of contrariety of treatment. A second, is the unquestionable difference of type or nature which the fever presents at different times. A third is the various, and to some extent, conflicting theories of its nature, formed by different physicians; a fourth, is preconceived opinion as to the powers and effects of different remedial agents. In proceeding to discuss its treatment under the advantage of being equally uncommitted to every method, and the disadvantages of never having witnessed the effects of any, I shall, as far as possible, unite the philosophical with the historical; and endeavor to investigate the grounds of success and failure in connection with the testimony which different practitioners have borne to them.

1. *Bloodletting.*—Whether we refer to the decisive influence of this remedy, to the universality of its employment, or to the stage of the disease in which it should be resorted to, it deserves our first notice.

The benefits derivable from it may be referred to two heads.

1. In the stage of prostration, at the beginning of the fever, it may sometimes favor reaction, as it does in certain cases of intermittent fever.

2. When reaction has taken place, it reduces the force of the heart; diminishes internal congestions, arrests their change into true inflammations, moderates them if established, favors the restoration of the suspended cretions; and increases the susceptibility of the system to the action of edicines.

1. In ordinary cases, reaction occurs spontaneously. It is when the sease is marked by a malignant or highly congestive character, under a werful and withering impress of the remote cause, when the forces of e system rally slowly and imperfectly, that venesection has been employed a means of promoting reaction, or of preserving the internal organs from e effects of congestion until reaction shall spontaneously take place. Of s employment for this purpose, Dr. Cartwright* has spoken in terms decided disapprobation. In his numerous trials, he seems never to have en it followed by reaction, and in several instances, a reaction which had gun was arrested, and a state of alarming debility induced. Dr. Dodd,† owever, in cases in which reaction took place slowly and the depression as great, saw the loss of from one to two ounces of blood every hour or wo followed by the happiest results. It must be admitted, I think that in hese cases, the bleedings produced but little effect.

I do not find, either in the published accounts or in my MS. notes of he experience of a great number of physicians, any other than these limited ecords of experience on this subject, from which we may conclude that venesection has not often been resorted to as a means of promoting reaction.

2. Let us turn our attention, then, to its employment after reaction has aken place. As in some epidemics this occurs much more slowly and eebly than in others, and never runs very high, the time when bloodletting hould be employed and the extent to which it can be carried, vary from n early and liberal, to a total omission of that remedy. Dr. Cartwright has ably pointed out this ataxic reaction, and cited cases to prove that, if bloodletting be not deferred until reaction is established throughout the organism, it may arrest the efforts of nature and throw the patient back into the state of enervation from which he was emerging; whereas if it had been postponed a few hours decided advantage would have followed its use. Still, as already intimated, there are cases every season in which the excitement never becomes so developed as to permit a resort to this remedy; and according to the observations of many physicians, even entire epidemics are of this character.

It is certainly desirable to know by the symptoms when the lancet may r may not be employed.

* Amer. Med. Rec. vol. ix. Epidemic of 1823. † Western Journal (Cincinnati), vol. v.

Dr. Dowler says if the vessels of the conjunctiva are filled with dark blood, the eye sad and watery, the tongue white and dry, or raw like beef, and the pulse at the same time small, blood should not be drawn either at the commencement or any subsequent stage of the disease. Dr. Harrison says when the patient is of a nervous temperament, or feeble constitution, when any ataxic symptoms supervene, such as nervous delirium, &c., the lancet should not be thought of. Dr. Morgan intimates that when there is little vascular excitement, much torpor both mental and physical, and great irritability of stomach, venesection does not succeed. Dr. Rushton* informs me that in cases attended with but little heat, a pulse often not above 90, irritability of stomach and apathy of mind without delirium, the patient answering that he is better, the lancet is inadmissible. Drs. Williams and Andrews have published,† that when the fever prevailed in Rodney, the pulse in some cases was soft and compressible, in others tumultuous, bounding, but gaseous, and easily arrested. Such cases would not bear the lancet. Dr. Perlee, in his account of the epidemics of 1817 and 1819, at Natchez,‡ says, that the necessity for venesection did not exist. In some patients with plethoric habits it was used, but without any good effect. There was none of that mitigation of suffering which this powerful remedy produces when appropriately employed.

The experienced Dr. Hulse,§ declares that in some epidemics the depressed vitality of the organic nerves is such as to occasion a languid circulation of the blood, in which cases, venesection hastens a fatal termination. "This," continues he, "was the character of the epidemic in Pensacola, in 1839, when in private practice I treated one hundred and forty-six cases, almost invariably without bloodletting, with a loss of only six."

Dr. Buegnot|| says, of one form of yellow fever, "the face is pale, the pulse is soft and a little frequent," in which case, only small revulsive bleedings are advisable.

To this testimony we may add that of Dr. Lewis of Mobile, who says, "In these years (1842, 3, and 4), I did not meet with a patient, &c. (see page 424), whose pulse was *hard, tense, contracted, or wiry;* even in cases where it was 115, it was invariably *gaseous* and *bubbling.* Coupling this state of the pulse with the certainty that it would in a few hours sink to 80, 70, and even 60, after which collapse with a train of debilitating phenomena must ensue, none could be found so hardy as to draw blood from a vein. The operation under such circumstances as these, would have been entitled to a distinction, which none but a Sangrado could have envied."

Dr. Fearn, of the same city, found bloodletting ineffectual and injurious

* MS. Mem.
† Maryland Med. and Surg. Jour. vol. ii.
‡ Phil. Jour. vol. iii.
§ New Or. Med. Jour. vol. i.
‖ New Orleans Med. Jour. vol. i. p. 18.

1842; and Drs. Levert, Nott, Lopez, M'Nelly, and Woodcock of the e place, have informed me, that the epidemic of 1843, with very few ptions, absolutely forbade bloodletting.

s prominent symptoms, as narrated to me by Dr. Nott, were a slight l, or none; pain in the back and muscles, often violent; but little gas- irritability in the beginning; bowels generally regular, and the first uations from medicines commonly healthy; the heat of the surface r very great; the pulse not commonly above 110 or 115, in force r above but often below the standard of health; flushing of the face eyes, moderate; thirst not intense, often none; tongue often perfectly ural; intellectual functions sound, but the feelings and expression of coun- nce, anxious.

hese authorities although they very imperfectly acquaint us with the gnosis of those cases or epidemics in which the lancet is contraindicated, sufficient to establish the important fact that such do exist, and that odletting is not always required or even safe.

et us inquire, secondly, what symptoms characterize those individual es as well as epidemics, which demand venesection, and also the extent which it should be carried.

Dr. Cartwright* remarks, of the Natchez epidemic of 1823, that when e heat of the whole surface is excessively increased, the pulse full and ong, the patient lying naked, and calling on the attendants to fan him, d to give him cold water, we may bleed *fearlessly* and *successfully*. A all quantity will not reduce this violent reaction. It may be taken away y quarts. Such bleedings moderate the heat, alleviate the pain, soften the lse, revive the suspended secretions, and render the system susceptible to e impress of medicines.

In the epidemic of 1825 of the same city, Dr. Merrill† found that when ere was a full strong pulse, with acute pains in the head, back, and limbs, bleeding of from one to two pints, the patient being kept recumbent, was ttended with the very best effects. He often found it necessary to repeat e operation once or twice on successive days. All cases, however, were ot of this acute kind, for in some, collapse succeeded to free bleeding.

Dr. Dodd‡ assigns the following assemblage of symptoms as demanding e lancet: a full and hard pulse, a red and engorged eye with a glaring ex- ression, a severe and deep-seated headache, a furred tongue, hot and rough in, and laborious respiration. He often drew fifty ounces at once, and though greatly preferring to do it on the first day of the fever, often re- rted to it on the third. He made a large orifice, and suffered the blood flow until it changed from a dark to a bright red, when he arrested it, m having discovered that any further detraction after the appearance of t hue greatly debilitated and injured the patient.

*Am. Med. Rec. vol. ix. †N. A. Med. and Surg. Jour. ‡West. Jour. vol. v.

In the fever of Key West, 1824, Dr. Ticknor* whenever he found a tense and wiry pulse, however small, accompanied with tenderness, burning and oppression in the epigastrium, violent headache with red protuberant eyes, a tumid, flushed countenance, a hot, florid, and dry skin, had immediate recourse to the lancet. Sitting his patient up, he generally found the loss of from sixteen to twenty ounces productive of the relief which he sought to procure; but a revival of morbid excitement often rendered a repetition of the operation necessary, he rarely, however, observed any advantage and sometimes an injury from employing it after the second day of the fever. Among the good effects of this practice, was the facility with which cathartic medicines subsequently operated.

Dr. Morgan,† in the same epidemic, found that the officers of the navy who lived on a nourishing and generous diet, were greatly benefited by copious venesection, while the seamen who lived on salt-meat and sea-biscuit, and underwent great fatigue, did not bear that kind of treatment.

Dr. Barrington in his account of the fever in our national ships in the Gulf of Mexico, 1828, '29, and '30,‡ says, that of the few bled on board the Hornet, where the mortality was great, every one recovered. On the Grampus, when the attack was violent and reaction considerable, with a full active pulse, and severe headache, which happened in a majority of instances, he bled until a decided impression was made on the system. For this purpose it was generally necessary to draw from twenty-four to thirty-two ounces, and sometimes more. There was no death on the Grampus, after this practice was adopted. On the Peacock, however, the success was less. Out of ten reported cases, eight were bled from ten to forty ounces, of whom one half only recovered. Two who were not bled died.

Dr. Smith, in the fever at Galveston, 1839,§ when called to a patient, if the excitement was fairly developed, immediately raised him to a sitting posture, and bled him till slight faintness or a mitigation of the pains was produced, which generally required from twelve to twenty ounces. He seldom repeated the operation, and supposes he did not obtain from it all the benefits it might have conferred.

Dr. Huestis,|| who treated the fever from 1809 to 1812, in New Orleans and in the army, informs us that by bloodletting to the extent of sixteen or twenty ounces, he softened the pulse, abated the heat and pain, diminished the redness of the eyes, relieved the general distress, softened the skin, and sometimes brought on a general perspiration. He often repeated it in twelve or eighteen hours, and never had occasion to regret its employment, except when it was deferred to the third or fourth day, when it proved injurious.

In 1822, at Pensacola, Dr. M'Mahon¶ observed before the 9th of October the fever required a free and liberal use of the lancet, but after that time

* N. A. Med. and Surg. Jour. vol. iv. † Phil Jour. ‡ Am. Jour. vol. 12.
§ An Account, p. 25. || Topography and Diseases of Louisiana, 1817, p. 114.
¶ Medical Stat. of the United States Army, p. 40.

as, produced the happiest results.

nkrite, in the same city, 1829,‡ employed early and copious bleed-
he best effects. When thus employed, it mitigated every symp-
f postponed, it did harm, and when carried only to the extent of
en ounces, did no good.

epidemic of 1833, Dr. Barton§ found bloodletting universally re-
Keeping his patient in a horizontal posture, he drew blood, like
all, till the pain ceased, and repeated the operation when it re-
le rarely bled, however, more than twice from the arm, preferring,
cups or leeches. He speaks in the highest terms of the good
his depletion, which was sometimes carried to the extent of ninety

epidemic of 1841, according to Dr. Thomas,‖ although much sul-
quinine was administered, liberal bleeding was first employed.

printed authority which I shall cite, is that of Dr. Luzenberg,
rleans, and the historian of his experience, Dr. Buegnot.¶ Accord-
latter, Dr. Luzenberg has been accustomed in nearly all cases
fever since 1829, to resort to copious and repeated bleedings. In
tive, phlegmonous cases, he carries the bleeding to syncope, and
every six or eight hours, as long as the excitement continues to
frequently carries the first to full syncope, and the subsequent to
Of course the earlier in the disease the better; but both the gen-
tify that on the third and fourth day, and even in the midst of
orrhages which have been called passive, it is the best thing that
ne. After they have laid aside the lancet, they continue depletion
leeches, and on the whole, although they do not absolutely advise
n every case, and in all stages, and to the exclusion of everything
llow fever, they carry this remedy further, and place on it a more
reliance, than any other physicians of the Valley.

all the variety of data we could desire, and the conclusion must be, that, on the whole, yellow fever is a disease which has been met by the lancet, and that a majority of our physicians regard it as a *sine quâ non* in the case. If, however, we inquire for evidence of its power to stop the disease in the midst of its career, as it might a pleurisy or peritonitis from cold, or a gastritis from an acrid poison, we shall be disappointed; if we seek for proof that it can preclude entirely that pathological condition which follows the decline of the stage of excitement, and is characterized by a morbid constitution of the blood, passive hemorrhages, suspended secretion of urine, and the occurrence of black vomit, we shall find it inadequate, though it may greatly abate the danger of that stage, and favor the safe passage of the patient through it. Bloodletting, then, is not a specific for yellow fever, not *the* remedy, but still *a* remedy; not applicable to all, but yet to many cases; improper in some epidemics, demanded in others; not to be resorted to as a matter of course, but with discrimination; chiefly beneficial in the early, often pernicious in the latter stages; not employed to cure the disease, but to produce the mitigation of excitement, and create a predisposition for the beneficial effect of other remedies, which were recognized as its legitimate effects in the proposition affixed to this article, and through these effects, combined with the effects of other measures, causing the fever to run its course without destroying life.

Local Bleeding.—Cups or leeches have been still more generally employed, than the lancet. Almost every physician who has published, or communicated to me the results of his experience, has enumerated them among his remedies, and very generally with approbation. The discrepancy of opinion and practice which prevail as to venesection, has not arisen on the subject of topical bleeding. In certain epidemics and in particular cases modified by the constitution of the patient forbidding venesection to be employed, the local abstraction of blood has still been practised with advantage, or at least with safety. But, it is in cases which have required venesection, and after that had been carried as far as the physician deemed judicious, that cups or leeches have been most employed. The parts to which they have been generally applied are the epigastrium, the temples, the mastoid regions, the nuchæ, the back, and the loins, with a view of influencing the condition of the stomach, duodenum, liver, and splanchnic nerves, the brain and spinal cord, and the kidneys. That they have often done this most beneficially to the patient is undeniable.

By most of our physicians this mode of bleeding has been regarded as altogether subordinate to that with the lancet, and in all violent cases inefficient without previous venesection. Those among them, however, who, adopting the doctrines of Broussais, have regarded yellow fever, as a gastro-enteritis raising a general fever, have consistently believed that local bleeding from the epigastrium might in general be made sufficient, and at all

n topical distress followed the operation. In the same paper we
ied that he had made this a principal remedy for the preceding
, and had found it more successful than any other mode.
same epidemic,† Dr. Harris placed still greater reliance on this
Of eighty cases treated by him in this way but four proved fatal.
blished in detail twenty cases, of which two ended in death. Of
one the greatest number applied in a single case was sixty-six—
one twenty-six; in a number of cases both were employed, and
e for the whole would be about twenty-one leeches and eleven
ey were generally applied to the epigastric, hypochondriac, and
gions, the back of the neck, and behind the ears. The quantity
hus drawn, was evidently much less than would have been lost
l number of cases by the lancet in the hands of one who practised
n in this fever; and the constitutional effects were corresponding.
ance is a tendency to syncope mentioned; but in nearly all the
rings in parts over which the cups or leeches were applied, were
ly mitigated or removed. It would appear then that local bleed-
ously employed, may be made a substitute for venesection. In
s it may even be preferable; but, for the same reason, in others
o be relied upon, unless, indeed, it be carried so far as to produce a
nal, in addition to a local effect, when perhaps it would be quite
rely on the lancet. In private practice during an epidemic, the
and expense attendant on adequate cupping and leeching must
nstitute drawbacks on the success of the practice; which is there-
kely to supersede, but rather to continue subordinate and auxiliary
tion. In hospital practice, it may to some extent be otherwise,
e and means admit of a larger abstraction of blood from particular
many patients are brought in, when the disease is too far advanced
venesection. It must be borne in mind however that in the

Emetics.—In the fever of Natchez in 1823, and of that city and Washington in 1825, Dr. Cartwright, Dr. M'Pheters, and some other physicians, found full doses of tartar emetic eminently beneficial in bringing on reaction, and equalizing it throughout the system. In cases attended with great coldness and depression, they did not succeed. When given after reaction was established, their effects were equivocal, and in the third stage of the disease, injurious. In 1837–39, Dr. C. used them, but found their effects less beneficial. In the same disease, Dr. Merrill, in the early stages, encouraged the disposition to vomit with warm water, and found it beneficial, but did not administer emetics. In the preceding epidemics of 1817 and '19, Dr. Parke did not employ them; nor did Dr. Monette in that of Washington in 1825. Dr. Branch of the same town, however, gave tartar emetic and Epsom salts, as he informed me, with advantage. Latterly, the physicians of Natchez do not appear to have employed emetics.

Of the physicians of Vicksburg, I am acquainted with the practice of Drs. Hicks, Balfour, Harper, and Anderson (now of St. Louis), and none of them employ emetics.

In Rodney, Drs. Williams and Andrews administered emetics early in the disease in a number of cases, but they did not promote reaction, and often produced much gastric distress.

In Woodville, Dr. Kilpatrick eschewed their use, on account of the irritability of the stomach.

At Key West, in the early stage of the fever, when the stomach was loaded, and there was a sense of oppression, with nausea, Dr. Ticknor gave them with essential benefit. They promoted a favorable reaction, and often gave an early and salutary determination to the skin. When he had reason to believe there was gastric inflammation he withheld them. Dr. Morgan, in the same epidemic, administered an emeto-cathartic in all cases in which the disease suddenly supervened on a full meal, and found it not only safe, but beneficial.

In his account of the treatment of yellow fever through several epidemics at the Navy Yard, on board of ships, and in Pensacola, Dr. Hulse says nothing of emetics.

Dr. Dodd, even as late as the third day of the fever, when the stomach had been irritable, without what he regarded as signs of inflammation, gave emetics of ipecac., and the sulphates of copper and zinc, with excellent effects.

Dr. Lewis, in his incidental notices of the treatment of the fever in Mobile, says nothing of emetics. From Drs. Levert, Fearn, Nott, Ross, Harrison, and Kovaliski, I learned that they did not administer emetics. Dr. Woodcock, however, has given them, when the tongue was heavily furred and brown.

At Galveston, Dr. Smith encouraged the early vomitings with tepid water, but never gave emetics.

Drs. Stone, Meux, Rushton, Campbell, Mackie, Jones, Kennedy,
am, of New Orleans, I learned that they do not employ emetics.
may be received as a fact that emetics are not among the reme-
ellow fever, in the Valley of the Mississippi. A number of its
have tried and rejected them; others I presume have never
them. It is possible that to some extent their disuse may be
to fashion, for it seems that in the years 1823, 4, and 5, Dr.
t and Dr. Ticknor found them beneficial in many cases. Since
d the emetic practice in most of our diseases has been rapidly on
e. I cannot but think that in the forming stage of the fever, when
ch happens to be loaded with undigested food, or which sometimes
with bile, as is evinced by its spontaneous ejection, an emetic
of service. There cannot then be any active inflammation to
icate its use. In very malignant cases, such as will not in any
it of bleeding, an emetic might promote reaction; but adminis-
uch a state of the system, it should be of a stimulating character.
RTICS.—About the year 1812, Dr. Huestis found an attention to the
e bowels especially necessary. He used calomel and jalap, aided by
salts, cream of tartar, and injections. Large doses were required,
ious evacuations of a dark green or black color were produced.
and 19, Dr. Perlee gave ten grains of calomel every hour, till
ations were obtained, and speaks highly of the practice. In that of
. Cartwright found cases which required the lancet, successfully
ith purgatives, and whenever they produced bilious discharges
d especially beneficial; sometimes, however, they occasioned serous,
r bloody discharges, then they were injurious. On the whole he
mild, to drastic cathartics. His time for administration was
e stage of excitement. In 1825, he frequently gave boluses, of
cammony, and aloes, and also resorted to croton oil and oil of tur-

other saline cathartics, keeping up a brisk operation for two or three days, when his patients generally did well. In 1828, Dr. Cronkrite produced copious and repeated evacuations, by giving fifty or sixty grains of calomel, and following it up with castor oil or salts.

About the same period, Dr. Dodd, after first opening the lower bowels with injections of sea-water, administered large doses of calomel and jalap, followed by sulphate of magnesia, or substituted for them pills of calomel, aloes, gamboge, tartar emetic, and croton oil. Such was the practice pursued previously to the year 1830.

In 1833, Drs. Barton and Harris, governed by the ideas of Broussais, discarded calomel and all drastic cathartics, in place of which they administered an occasional dose of castor oil, and assisted its operation with large emollient and oleaginous injections.

In the Galveston fever of 1839, Dr. Smith, after the few first cases, abandoned calomel as a purgative, and opened the bowels with an infusion of senna and rhubarb, which he preferred to every other cathartic. He occasionally assisted it with an injection. After the free operation of one dose of this medicine, he preferred to leave the bowels in a state of repose, and did not repeat it, at least till the next day, and then not in large doses.

Dr. Hulse administers a scruple of calomel, to be followed by castor oil, and in some cases an injection. He lays much stress on early and free evacuation of the bowels, but this once effected, he aims at no more than a couple of discharges every twenty-four hours. He gives a caution against hypercatharsis, which may end in diarrhœa, with dangerous prostration.

We learn from Dr. Lewis's paper, that he and his medical friends in Mobile are in the habit of exhibiting a small dose of calomel, or that medicine and rhubarb combined, followed by castor oil, salts and senna, or sweet oil and fresh lime-juice, subsequently they maintain the action of the bowels with blue pill. What I learned from Dr. Fearn, Dr. Levert, Dr. Nott, Dr. Ross, and several other medical gentlemen of that city, corresponds with this statement. Several of them are in the practice of giving pills composed of equal parts of calomel and the blue mass; some prefer calomel and the compound extract of colocynth; some give blue mass, or that medicine combined with rhubarb and succeeded by oil. Whatever may be the means used, every physician aims at nothing more than gentle purging, and regards a drastic operation as injurious.

In New Orleans, at this time, the practice is similar. Dr. Harrison has published a condemnation of drastics. He thinks it important to evacuate fully the existing contents of the bowels, by mild cathartics, after which it is sufficient to maintain the peristaltic function, which can generally be done with injections. Of cathartics he prefers blue pill, or calomel, in a small dose, followed in a few hours by castor oil or some saline laxative. From the numerous respectable physicians, quoted when speaking of emetics, I

at under all circumstances they employ only the gentlest laxatives
ections, almost without exception condemning the use of any
l preparation. Dr. Buegnot, in his paper already quoted, speaks
of free alvine evacuation with more approbation than his brethren
y; admitting that before inflammation has established itself in the
membrane, the local depletion occasioned by cathartics may prove
l; but that on the whole they are of doubtful propriety, and can
employed in certain cases.

pears from all that has been said, that 25 or 30 years ago, active
in our yellow fever, in imitation of that which according to Dr.
oved so eminently beneficial in Philadelphia, in 1793, was far more
than at present, or than it has been for the last 15 years. To
e we to ascribe this change of practice, a change which our phy-
elieve is founded on experience? Has the disease undergone a
in its character? Have *theories* in medicine worked out a change
ice? Or is it true that *copious* purging is not so injurious as we
pose, and yet, that gentle purging, will give us all the benefit of
t violent? I am disposed to ascribe something to each of these
es. But without dwelling on the causes which have brought about
ification of a practice, let us inquire into its *modus operandi*, effects,
itations.

e early necessity of evacuating the contents of the stomach and
which retained would prove a source of irritation, there can be no
but in reference to *this* object, it is manifestly proper to use mild
irritating means. It is sometimes said that the evacuation must be
with some activity throughout the disease, because of the reaccu-
n of morbid secretions, but as the liver must necessarily be a chief
f these, and as many of the symptoms and pathological appearances
that organ to be commonly in a torpid condition, there would ap-

æmias, while they diminish the morbid excitement of the heart and vascular system; and on this effect no doubt much of their efficacy depends.

Let us inquire into the injuries they may produce. 1st. In malignant cases, when the reaction of the system is feeble, they may exhaust too much; and when there is a tendency to diarrhœa in connection with constitutional enervation this danger is still greater. 2d. If inflammation of the mucous membrane actually exist, they can scarcely fail to aggravate it if pushed very far; and, even when there is only simple congestion, it may be a question whether active or irritating cathartics may not transform it into inflammation. 3d. In proportion as they establish a drain from the mucous membrane they create a flux of blood towards it. They give to that fluid a centripetal direction. They invite a great deal into the viscera, which does not accumulate in them, simply because it is transformed into secreted fluids and then carried out of the system. Thus under their influence the exterior parts of the body lose too much of the circulating fluid, and the skin fails in its functions, the internal organs meanwhile becoming the seats of irritation and fluxion. If a patient labored under an inflammation of the brain, the eye, the skin, or a joint, from some common cause, copious purging might cure it by the combined influence of revulsion, depletion, and enfeeblement of the heart; but, as we have already seen, when speaking of venesection, yellow fever cannot be thus terminated, and therefore such purging will not cure the fever. As a simple antiphlogistic measure, it has moreover this disadvantage, that the stomach, whether gastritis exist or not, is generally irritable, and purgatives are not only liable to be ejected, but they frequently increase that condition.

The following, then, are the restrictions which theory imposes on the use of purgatives, and the rules which it suggests for their administration.

1. Those which are least offensive to the stomach and least likely to irritate the bowels, should be chosen.

2. When the reaction of the system is feeble, and when the excitement is declining, they should be exhibited sparingly.

3. When the excitement runs high, copious bleeding should precede their operation if not their administration.

4. Such as increase the secretions from the liver and the mucous membrane, should be preferred.

5. When the head is greatly affected and the excitement of the system considerable, their operation may be pushed further than under other circumstances.

6. As a means of relieving the congestion of the abdominal viscera, not of producing revulsion from distant parts, their action should be moderate, otherwise, as we have seen, they will invite blood into those organs.

7. As evacuants from the lower bowels, when costiveness exists in connection with an irritable stomach, injections should precede the administration of purgatives.

administered in doses incomparably smaller than it was thirty
; but there is no reason to anticipate that it will fall out of the
of cathartics employed in this fever. It was formerly, however,
a different purpose, and to that we now turn.

obvious involvement of the hepatic in the disorder of the abdo-
ctions, and the generally admitted specific action of calomel upon
suggested its liberal exhibition as a means of restoring, reducing,
ing the functions of that gland, and to this end, aside from its
effects, it was administered in large quantities.

arded as an antiphlogistic alterant, it was given to produce specific
onal effects, on the development of which, it was expected the fever
se.

y other things were done in connection with this practice, and as
s on different modes of treatment by our physicians are generally
erfect, it is not possible to institute a conclusive comparison
he mercurial and other methods. We must rely then on its general
ent for the evidence that it was not successful. The objections to
st. It generally fails to re-excite the functions of the liver. 2d.
of excitement is too short to permit the establishment of a con-
l effect. 3d. When that effect has been produced, it has not pre-
e stage of collapse with its petechiæ, passive hemorrhages, and
it; but in the opinion of some physicians with whom I have con-
emed to aggravate them. That this is not altogether imaginary,
ferred from the well-known injurious effects of calomel in scurvy,
n which the blood, as in the third stage of yellow fever, is deficient
4th. Those who have recovered under the constitutional impress
, have often experienced a tedious convalescence, in connection with
us ulceration of the mouth. 5th. By relying on calomel, other
less equivocal value, have sometimes been neglected.

Of seven patients who were treated in the first method,—

1 took of calomel, 5 scruples, and was fit for duty in 20 days.
1 " " 7 " " " 22 "
1 " " 10 " " " 28 "
1 " " 11 " " " 22 "
1 " " 12 " " " 22 "
1 " " 13 " " " 22 "
1 " " 15 " " " 39 "

All of these were salivated.

Of seven who were treated on the non-mercurial plan,—

2 were well and fit for duty in 11 days.
1 was " " " 11 "
1 " " " 12 "
1 " " " 17 "
2 were " " " 19 "
1 was " " " 20 "

Of the nine fatal cases, eight were treated with mercury; of
were salivated, or had the mouth affected.

The remaining cases underwent a mixed plan of treatment.
them calomel was used, but not with the view of salivating; the
in from sixteen to twenty-six days.

NON-PURGATIVE ALKALINE SALTS.—The practice recomm
Stevens, founded on a discovery or supposed discovery—
fever, even from the period of its incubation, there is a d
saline ingredients of the serum of the blood, has not been
physicians to a sufficient extent to ascertain its effects. I
back as 1831, had verified this condition of the blood, b
to have founded his practice upon it. He mentions tw
which may be regarded as connected with it. 1st. He u
neutral salts, as laxatives, with much benefit. 2d. He
injections of sea-water of great value, and believes that po
absorbed from the rectum and colon.

to this, or to the suggestions of Dr. Steven
French physicians of New Orl
of the bowels, de

was administered in smaller doses, or at more distant intervals.
s the union of a non-laxative with laxative salts, constituting sub-
y the practice afterwards advised by Dr. Stevens. At an earlier period
7–19, Dr. Perlee has used with advantage, as a laxative, the bitartrate
carbonate of potash, combined in such proportions as to give a slight
o the latter. Dr. Hulse, although admitting a deficiency of the
gredients of the blood, does not seem to have founded on it any
his practice. During the excitement, he gave from half a grain to
of camphor, with from three to five grains of nitrate of potash
o or three hours, and allowed effervescing draughts of tartaric acid
rbonate of soda.

ommittee of the *Société Médicale de la Nouvelle Orleans*, in their
of the epidemic of 1839, inform us that a solution of muriate of
a was tried by some of them in the third stage of three cases, when
d symptoms were present, and two of the patients recovered; and
mas informed them that he had obtained a similar result in one re-
y bad case.

e other printed accounts so often quoted, I do not find any notices
ractice worth transcribing; and my notes of unpublished experience
lly destitute of any observations on this class of remedies.

uld appear from all that has been said, that the method proposed by
ens has not found favor enough with our physicians to secure it a
Now, apart from the theory of reduction in the saline ingredients of
d, and the propriety of restoring them, whether that loss preceded
ed the morbid excitement of the solids, there would seem to be two
n which the non-purgative neutral alkaline salts might be service-
yellow fever. First, they are refrigerant, and might, therefore, in
quantities, abate the heat and excitement of the second stage, and
minish the necessity for bloodletting. Second, they are diuretic,

fixed to this article, it is represented as a fever of one protracted paroxysm that is, a short continued fever—which is undoubtedly true—nevertheless in many seasons and localities, it has displayed a remittent type, alwa terminating in the third stage, however, by the fourth day, and not runni on like the ordinary remittents of the country. This trait of character the result, in all probability, of one of the two following causes. 1st. may be that this disease is in fact the offspring of a modification of the sa cause which produces our common autumnal fever. 2d. It may have a ca specifically distinct, and be modified in its type by the remote cause of the latter disease. Without going into an inquiry as to the relative claims of these two hypotheses, we may admit that whenever the fever presents a remitting character, the treatment adapted to that form of fever will, *a priori*, be found beneficial. This is the view under which the sulphate of quinine has been administered in certain epidemics—a practice which, within the last few years, has excited in New Orleans and Mobile a considerable degree of controversy. Claims of priority in its use going back to 1837 and 1835 have been set up by different gentlemen; and while some have condemned the practice altogether, others have looked to its first employment as a source of reputation.

Without looking beyond the limits of our own Valley for old evidence of the employment of the bark in yellow fever, we may go back to 1825, when Dr. Cartwright, Dr. McPheters, and Dr. Monette, especially the two former administered the sulphate of quinine even when there was preternatural heat of the skin, and found it beneficial.* A few years afterwards, Dr. Dodd, whose publication was made in 1831,† made a far more liberal use of it, and obtained very satisfactory results. After an energetic resort to venesection and other means of reducing the excitement, till the pain began to abate and the pulse to soften, he administered the sulphate of quinine or the sulphate of cornine‡ in large doses, usually in conjunction with powdered cinnamon and ginger. If remission took place in twelve or twenty-four hours under his antiphlogistic treatment, he gave from fifteen to twenty grains every hour until 80 or 100 grains had been taken, which he found sufficient, but if forty-eight or seventy-two hours were required to effect an adequate abatement of the febrile action "from twenty to thirty grains were given every twenty minutes or half an hour, until 100 or 150 grains had been taken, and then a less quantity at longer intervals." In illustration and support of this practice he published a considerable number of successful cases; and as the quantity administered has not since been surpassed, perhaps not equalled, Dr. Dodd may justly be regarded as the first to establish the safety of this practice.

In 1832, Dr. Halphen,§ in New Orleans, when treating cases of yellow

* Am. Med. Rec. vol. ix. † West. Jour. vol. v. p. 54.

‡ [Cornine is an alkaloid resembling quinine, extracted from the bark of the Cornus Florida.—Ed.]

§ Mem. Sur. Le Chol. Morb. Compliqué d'une Epid. Fièv. Jaune.

plicated with epidemic cholera, administered the sulphate in combi-
th lactucarium.

moir contains the details of a great number of cases in which ac-
his judgment the curative effects of the prescription were so obvious
garded it as *le remède par excellence*. His standing prescription

R.—Sulph. Quin.	- - - - - - -	℈ii.
Lactucar.	- - - - -	grs. vi. vel. viij.
Misce. Fiant. pil.	- - - - - -	xii.

nerally ordered one of these pills every fifteen, twenty, or thirty
and frequently administered the same medicine *per anum*.

5, Dr. Stone, as he informed me, began the administration of the
n the Charity Hospital on the final subsidence of the fever, but after-
e it in the first remission, while thirst and headache were still present.
s use, these abate, and perspiration comes on. He gives from five
ains at once, repeating the dose till roaring in the ears is pro-
During its use he keeps the patient perfectly quiet on his back
s him cold drink. As a preparation for its use he sometimes
d generally cups and purges moderately with calomel and castor
alled for the first time to a case which presents a remission, he pro-
nce to the administration of the sulphate. He has seen black
ur after the administration of this medicine but the number of
is *very* small, and it seemed to be brought on by the patients
prudently from bed.

ckie, as he informed me began the exhibition of the sulphate in 1837
ion only, giving it in 1839 by the mouth, and has continued
ince, being in fact one of the firmest advocates of the practice
Orleans. He depletes by the lancet and cups, opens the bowels
ctions, and then gives at a single dose twenty or thirty grains
edicine, which in general he finds sufficient. If the stomach
ble he administers it by injection. He again cups if necessary
e local affections, and then administers the sulphate in smaller
n the Charity Hospital, 1839, Dr. Mackie and Dr. Hunt, who
began the exhibition of the sulphate, made a number of ex-
s on its physiological action, with a view to its use in the fever.
lts were reduction of the pulse below its normal frequency, once
ight in a minute; sleepiness; perspiration; roaring in the ears, and
ilated pupils, with all of which except the last the profession were
When the medicine was administered in large doses it was found
in the urine.*

rrison seems to have begun its exhibition this year, and the results
eneral highly satisfactory; he is a zealous advocate of the practice,

* New Orleans Med. Journ. vol. ii. p. 331–2.

but like Dr. Stone, has lost two patients with black vomit, after their systems had been brought completely under the influence of the medicine.

In the same season, Dr. Jones entered on its use, after venesection and mild cathartic, and saw from thirty to fifty grains at a dose produce the happiest results. His patients have, however, occasionally died with black vomit notwithstanding the fever seemed to be cut short by this treatment, and, as he found the recovery of his patients generally tedious, he has abandoned the practice.

In 1837, Dr. Lambert, a Creole, was among those who made a decisive use of the sulphate, and exerted an influence on many other physicians of the city, in its favor.* In 1839, Dr. Buegnot began to employ it, and during that season, but still more, in the epidemic of 1841, he and Dr. Lewis, without concert, resorted to it immediately after very copious or syncopal bleedings, producing an artificial remission, with the effect, according to the former, of curing the fever as if by enchantment. In a report already quoted, to the French Medical Society, of New Orleans, on the former epidemic, the committee present an elaborate criticism on this practice, and insist that its beneficial effects were limited to cases which partook largely of an intermittent character. They declared that death occurred after the system had been brought under the influence of the quinine, and show that the epidemics of 1837, '39, and '41, were *per se* less fatal than those of former years, and declare that in their own practice, under the use of moderate venesection, cupping, leeching, laxatives, enemas, refrigerating drinks, and topical bathing, but one out of fourteen died. Dr. Thomas in his report on the fever of 1841, took nearly the same ground.

On the whole, it may be said, that the efficacy of the sulphate of quinine in the yellow fever of New Orleans is at this time a question on which its physicians are not agreed.

According to Dr. Lewis† the sulphate of quinine has signally failed in every form of yellow fever, in Mobile. In my inquiries of its physicians I came to nearly the same conclusion, although from the extensive sources of malaria which surround it we might expect that its yellow fever, more than that of some other places, would require that medicine. And in the opinion of some of its physicians this is the case, for Dr. Gayle informed me that in 1843 he treated a considerable number of patients on that plan with great success. In his monograph, Dr. Hulse informs us that in the yellow fever of Pensacola Bay, he had used the sulphate too little to judge of its powers. In the fever of Galveston, 1839, Dr. Smith did not employ that medicine. In the Rodney fever of 1843, Drs. Andrews and Williams did not use it. In the Woodville epidemic of 1844, Dr. Kilpatrick found that it uniformly acted well, when preceded by venesection and cathartics, producing gentle perspiration, composing the system, and imparting tone to the stomach. Experience taught him, however, that when given alone it

* Dr. Buegnot. New Orleans Med. Jour. vol. i. † New Orleans Med. Jour. vol. i. p. 427.

produced or aggravated gastric irritability, and he at length fixed on the following compound:—

R.—Sulphate of Quinine,	℈ij.
Lupulin,	ʒss.
Ol. Pip. Nig.,	fʒj.
Tinct. Opii,	fʒj.
Gum Arabic,	q. s.

Fiant pil. xl.

Of which he gave one every hour or every two hours.

To return to unpublished experience. Dr. Harney at Baton Rouge, in 1843, gave large doses of the sulphate in combination with calomel, to three patients in an advanced stage of the fever, and they all recovered; but he had previously given it without effect in smaller doses. In the Natchez epidemic of 1837, Dr. Davis treated seventy cases without the lancet. After the operation of a cathartic, he resorted to the following combination:—

R.—Sulphate of Quinine,	grs. xx.
Calomel,	grs. x.

M. fiant pil. viij.

Two of these pills were given every two hours. He did little besides, and his patients recovered. In 1839 this plan did not succeed, but on the third day, after free depletion, it was attended with the best effects. At Vicksburg, in 1843, Dr. Hicks, after free bleeding and purging to reduce the excitement, gave small doses of sulphate of quinine combined with sulphate of morphine with happy effect. In 1841 at the same place, Dr. Balfour found, that towards the close of the epidemic, the copious bleeding required in the early part of the season could not be borne, and he then dressed the blistered surfaces of his patients with sulphate of quinine and sulphate of morphine, administered the former by injection, and at length by the mouth with satisfactory results.

Such is the history of the employment of the sulphate of quinine, in the yellow fever of our Valley. Let us now devote a moment to the conclusions which it suggests, and the fitness of the medicine to the treatment of that fever.

It is undeniable that the quinine has proved beneficial in the practice of a number of our physicians; but can it be regarded as a specific, even in the modified sense in which it is a specific in autumnal intermittent fever? I think not; for in the hands of several physicians, it has not produced any decided benefit, and all who have used it extensively, have seen patients die with black vomit after their systems had been thoroughly brought under its influence. Indeed, of its value in yellow fever, unmodified by any autumnal intermixture, we have not any satisfactory proof. Nevertheless, so many epidemics present a mixed character, that even limited to them, its importance is very considerable. When no alliance of this kind exists, I am

disposed to believe that it may shorten the stage of excitement, if exhibited in large doses immediately after copious depletion. Its narcotico-sedative effects on the nervous system of animal life, and the centrifugal determination of the blood which it favors, as is shown by the diaphoresis which follows its exhibition, are well fitted to extinguish the morbid excitement. But, in *pure* yellow fever, is this the subdual of the disease? It would seem not; for after the patient has lain for two or three days under its influence, in what Dr. Lewis calls the "state of calm," collapse, black vomit, and death may happen. There is, then, an insidious lesion of the system, which it does not reach: a root of malignity which it cannot eradicate. In the treatment of the most dangerous intermittents—either inflammatory or congestive—it does not display this impotence; for after its impress on the system is established, no ulterior fatal symptoms need be apprehended. The third stage of yellow fever is not, in fact, the same pathological condition with the apyrexia of an intermittent. It ends in health, or collapse and death; while the apyrexia of the intermittent never terminates in health or death, but in a new paroxysm. We should not then be surprised at a difference of effect in the sulphate of quinine in the two cases; nor at the small degree of success which has as yet followed the efforts to ward off the collapse of yellow fever by treating its third stage with the quinine. We must now pass on to other remedies.

APPLICATIONS TO THE SKIN.—These may be divided into three classes, —hot, cold, and irritating. I shall here consider their use in the first and second stages of the disease.

1. Hot bathing, especially of the extremities, has been found beneficial in the first stage, as a means of producing reaction. In the second, tepid bathing and sponging, have often reduced the heat and exercised a soothing influence on the nervous system, thus relieving local pains and at the same time preparing the skin for a resumption of its functions.

2. Cold water as a dash has been used to excite reaction, but the reports are not greatly in its favor. Subsequently, in the stage of excitement and heat, it has by some of our physicians been extensively applied, but on the whole, seems to have failed to afford the relief that was anticipated, and some of them thought it did harm by reducing the temperature of the surface too much, and increasing the internal congestions. The restricted or topical application of cold water, either with or without some vegetable acid, as vinegar or lemon-juice, has proved beneficial in relieving the head and spinal region from pain and congestion. Cool and fresh air, not directed upon the naked surface, have been found beneficial.

3. *Irritants.*—The hot baths applied to different parts of the body, as the lower extremities, epigastrium, and spine, in the cold stage should be rendered stimulating with mustard, capsicum, salt, turpentine, or ardent spirit. In the second stage, a sinapism or blister on the epigastrium, has often relieved the stomach from irritation, and reconciled it to the impress

medicines. The same applications to the nucha and loins have moderated the head and back-ache; but on the whole, dry cupping and local pid bathing, seem to have done more good than severe counter-irritation.

SUDORIFICS.—I have been told of a man who on being seized with yellow ver, drank a pint of whiskey and retained it on his stomach. He fell leep, a drenching perspiration came on, and continuing for a whole night, rminated the disease. The case might, perhaps, not have been yellow ver, but it seems exceedingly probable that if in the early periods of the isease such a perspiration could be excited it might prove curative. The omach, however, is in almost every instance too irritable to sustain either udorifics, generally nauseating, or diluent drinks in sufficient quantities, nd hence, until the fever by other means has been so far reduced, as that pontaneous diaphoresis has come on, sudorifics seem to have done but little good. Of the propriety of maintaining and even promoting the secretion of the skin after it has thus spontaneously begun there can be no doubt, as the centrifugal direction which it gives the blood, is well-calculated to complete the removal of the internal congestions. It is perhaps by its sudorific influence, as much as any other that the sulphate of quinine has done good after sanguineous depletion. In promoting this function, great care is necessary not to irritate the stomach; and also not to carry the effect too far, as several physicians have found excessive sweating injurious. Of the diaphoretics that have been used, the best, perhaps, are the Spiritus Mindereri; the common saline mixture; laudanum and the spirit of nitrous ether, to which, when the stomach will bear it a little wine of ipecac. may be added; small doses of Dover's powder; and an infusion of sage, serpentaria, or orange leaves, the last of which is a favorite ptisan.

Concerning the Spiritus Mindereri in connection with another medicine, I may record the following facts communicated to me by Dr. Nott of Mobile. In the epidemic of 1843, he treated his first twelve cases by active bleeding and purging; and lost every one. He then resolved to give creasote in the Spiritus Mindereri, in the proportion of twenty drops of the former to eight ounces of the latter. A tablespoonful every two hours was the dose, and the stage of excitement the period for its administration. It calmed the irritability of the stomach, and for a month after he adopted this practice he did not lose a single patient. The fever of that year was not however of a very mortal character.

SECTION III.

REMEDIES IN THE THIRD STAGE.

EVERYBODY knows that in our ordinary autumnal remittent fever, the atient either dies or shows signs of recovery as soon as the febrile comotion ceases. It is very different, however, in yellow fever. Whether

combated by active treatment, or left to itself, the febrile excitement ceases in two or three days, not to be renewed; but the patient cannot be said, on that account, to begin to convalesce, for the hour of danger has not yet arrived, and may not come for even a longer period than has elapsed from the beginning of the disease. In this stage, it is true, the patient often desires, and is able to rise and dress himself; but all experience proves that such liberties are likely to be fatal, and that, should he even remain quietly and comfortably in bed, and avoid every irregularity, a revival of gastric irritability, a failure in the powers of the heart, and the fatally ominous black vomit may supervene, when every appearance had for twenty-four or forty-eight hours been auspicious.

It is in this stage much more than in the preceding one, that we find the peculiarities of yellow fever. In fact, it is not identical with any other known pathological state; though, as we shall hereafter see, it bears some resemblance to the collapse of epidemic cholera.

Now the question before us is, what can be done to conduct the patient safely through this treacherous calm? But another inquiry should be first proposed, which is, whether art can do anything to assist nature, and whether those who live and those who die would not experience the same fate if let alone? It is quite certain that many who have been violently ill in the preceding stages, have passed successfully through this; while others, who were reputed to have mild attacks, have ultimately died. It is equally certain, that under different modes of treatment in this stage, both recoveries and deaths have taken place; facts which favor the idea that art can achieve but little by her medications. But, waiving for the present a decision on this point, we may affirm that she is able to point out what contributes to a fatal termination, and thus to preserve life by obviating external causes that would destroy it; and this brings us to the regimen which all our physicians have found necessary, and for which it is needless, therefore, to cite individual authorities.

1. The patient must be kept in bed, and not allowed even to rise to the close stool, or at least to sit long upon it. He should be well, but not oppressively, covered with bed-clothes.

2. Whatever may be his appetite, he should not be allowed to irritate or load his stomach with food.

3. All debilitating or irritating medications should be carefully avoided, especially purging and copious sweating.

4. Care should be taken that urine does not accumulate in the bladder.

5. Every kind of mental irritation and depression should, as far as possible, be obviated.

A violation of any one of these precepts may suddenly develop fatal symptoms, even when the condition of the patient is in all respects auspicious.

We come now to inquire what *positive* treatment this stage of the disease

ay in different cases demand; in doing which, it will be necessary to cognize the pathological conditions which make it up, the whole of which ay never exist in the same patient. We have, then,

1. A reduction of the vital forces of the solids.
2. An impoverished condition of the blood, with hemorrhages.
3. Congestions or unsubdued inflammations in some of the tissues.
4. A suspended or reduced state of the great secretions, renal, hepatic, d cutaneous.
5. Diarrhœa.
6. That morbid condition of the stomach on which the production of ack vomit depends.

All the measures which do good in this stage of the disease operate to e correction of one or more of these pathological details.

Before proceeding to enumerate them, it is proper to say, that in favora- le cases, upon the subsidence of the stage of excitement, but few of these onditions exist. The exhaustion is not great, the circulation becomes quable, the appetite returns, and the secretions revive. Such cases as lready intimated, require no positive treatment. It is only necessary to insist upon attention to the rules mentioned above, and in a few days he may be allowed to dress himself, and re-engage in his duties. But these cases are not very numerous, and we come now to consider what art may be required to perform.

1. As to the exhaustion of the vital forces, it is sometimes extreme. Its greatest manifestations will in general, be in cases in which the morbid ex- citement is intense; or in which, from an original character of malignity, the period of excitement was replaced by an adynamic and ataxic condition. All such cases demand tonics and stimulants. From analogy, it might be supposed that the bark and the sulphate of quinine were well adapted to this emergency, but such is not the fact. The stomach is in general too irritable to tolerate a liberal use of the former, and the latter is too sedative in its action; nevertheless, when the stomach will receive the cinchona in substance, decoction, or tincture, it may be administered in moderate quan- tities, and the sulphate may be given in grain or two-grain doses, combined with stimulants. The practice, however, which on the whole, our physicians have found most efficient is alcoholic stimulation. Without presenting a tiresome list of authorities on this point, I may say that some prefer French brandy as most acceptable to the stomach, and administer it in large quantities; others have found ale or porter most useful: others cham- pagne, wine-whey, and egg-nog. In all cases, if delirium, or gastric irri- tability or frequency of the pulse should come on, they must be discontinued. But agents more strictly pharmaceutic may be used. An infusion of aris- tolochia serpentaria is often beneficial, acting at once as a tonic and sudorific. It constitutes a good vehicle for the Spir. Mindereri, which is adapted to this stage, as well as to that which precedes it. Carbonate of ammonia, camphor,

musk, and opium, or the sulphate of morphia, are also proper and more especially demanded when there is great restlessness, or spasmodic action in the form of hiccough or subsultus tendinum; when delirium *arises* during this stage, and has not subsisted from the stage of excitement, those medicines are not contraindicated by, but may abate it.

As the greatest of all restoratives is food, the question presents itself, how far the indication we are now considering can be fulfilled by adding it to the therapeutic resources which have been mentioned. To be a restorative, two gastric conditions are necessary:—1. The stomach must retain it without inconvenience; and 2d. Must be able to digest it. Now that organ appears in a great number of cases not to present these conditions; and the most reliable experience prohibits its use, except to the most limited extent, until the stage of exhaustion (in which it might seem indicated) has passed by, and the healthy appetite, feelings, and excretions of the patient indicate that convalescence has really commenced. Even after such manifestations, a hearty meal has produced black vomit and death. When food is given in the stage of exhaustion, it should be semi-fluid, and gelatinous, or amylaceous.

2. *Surviving Inflammations.*—I have said that stimulants, tonics, and nutrients, sometimes increase the gastric irritability or otherwise make the patient worse, and must be laid aside. To what can this be owing? We can scarcely doubt that it results from unextinguished gastritis; but how can this be, as in the stage of the disease we are now considering, the febrile excitement has ceased? The answer is, that not the inflammation of the stomach only, but that of the bowels, kidneys, brain, and other organs, is not primary, *occasioning* the fever, which would therefore continue till it ceased; but secondary or simultaneous with the fever, and cannot cease with it; for the reason that time is necessary to the resolution of every inflammation. Hence when the constitutional affection has run its prescribed or self-limited course, a certain amount of gastritis, duodenitis, nephritis or cerebritis, may remain (not ingravescent, but declining), and for a time render stimulants injurious. In whatever organ the inflammation may be seated, that organ will of course be unable to resume its specific function; and the more total that inability, the greater the danger. Thus if delirium, existing in the hot stage, should survive its decline, or the vomiting continue, or the secretion of urine or bile continue to be totally suppressed, or diarrhœa follow on the purging in the stage of excitement, the prognosis would be bad, and a *post-mortem* inspection would show inflammatory congestions and disorganizations in the organs affected. Of these surviving and subacute inflammations, those of the stomach, brain, and kidneys, are the most momentous; and of these again, that of the stomach, or of the stomach and duodenum, so frequently combined, is not only most frequent but most embarrassing, because of the obstacle which it presents to the administration of medicines or food. Now what can be done to promote the resolu-

on of these inflammations? The first and greatest remedy is time. From e hour when the fever subsides, they begin to diminish, and if we wait tiently, nature may effect their final resolution. But this, perhaps, is t always proper, and never agreeable to the feelings or sense of duty of ysicians, who like ours, are always disposed to energetic effort. That fort in these cases, however, must be made with prudence and moderation. enesection and purging, the great antiphlogistics, are of course out of e question; but in many cases local bleeding, or dry cupping may be ractised with advantage; and in all cases counter irritation will be proper. The local application of cold, especially when the head is affected, may be permitted; but the perpetual laving of the skin over the suffering organ, with tepid water is preferable. When the kidneys are affected, the oil of turpentine in connection with more specific diuretics may do good. The liver being inflamed, the internal and external use of nitro-muriatic acid should not be neglected. Lastly, when the stomach is the chief seat of the phlogosis, pellets of ice are among the internal remedies most to be relied on.

In many cases the inflammation during the fever may have been so intense as to decompose the tissues, and greatly abridge the duration of the stage we are now considering. In others there may have been only passive congestion, which may be roused into inflammation by excessive stimulation on the decline of the hot stage.

The diagnosis of these smothered and expiring inflammations is of course attended with difficulty; for an irritable stomach, delirium, suspended secretion of bile and urine, and a diarrhœa, may all exist from nervous irritability or torpor. Of course the sagacity of the physician must be severely tried by such cases.

3. *Impoverished and Deteriorated State of the Blood.*—It cannot be doubted, that the loss of a part of the fibrine and the salts of the blood (not to refer to hypothetical lesions of that fluid, which we have not the means of verifying), must constitute one of the sources of danger in the third stage of the fever, as we have already seen the hemorrhages of that and the preceding stage, seem to have this condition of the blood for their proximate cause. That it interferes with the revival of the vital forces of the solids and the restoration of the secretions may be fairly assumed. It is desirable then to correct it; but can this be done by any direct effort of art? Will the administration of food containing fibrine, and of the salts which belong to the serum, really increase those ingredients of the blood? In regard to the former, the answer must be in the negative, unless the digestive organs were capable of forming chyle, which presupposes the absence of that condition of the blood which it is proposed to correct. In regard to the latter, it is possible that the absorption of saline solutions from the stomach, if that function can be performed, may contribute to the saline impregnation of the serum. But still as the system has its peculiar method of incorporating the materials of the blood, it is conceivable that this mode of supplying them

may fail. Whence then can the vital fluid be replenished with its lost elements? The answer must be from the solids, which being but the elements of the blood in a different mode of existence, afford to the absorbents the means of recuperation. Of the activity of this interstitial absorption, in the decline of, and during the early convalescence from fever, we have evidence in the rapid emaciation which then takes place; and on it we must perhaps rely for the restoration of the blood to a normal condition after an attack of yellow fever. Thus preyed upon, the solids, as soon as their vital properties have begun to improve, and they are stimulated by a healthier blood, begin to demand retribution, and hence the insatiable appetite of convalescence,—an appetite, as some one has well observed, that is not limited to the stomach, but seems to reside in every fibre of the body, and has for its final cause the necessity of repair felt by the system.

But if it is uncertain whether art can contribute directly to an amelioration of the blood in the third stage of yellow fever, it is possible, perhaps, for her to correct the effects of its deterioration. These we have already attempted to show, are chiefly the hemorrhages so characteristic of this fever. When they begin during the acme or decline of the stage of excitement, they partake largely of the character of active hemorrhages, that is, there is local congestion and vis-a-tergo, in connection with diminution of fibrine. Such hemorrhages are not to be dreaded, for the system is not then in a state of exhaustion. They are even sometimes salutary as carrying off local hyperæmias. But when they continue long after the arrival of the third stage, or appear then for the first time, and especially if the patient has been freely bled, or he shows signs of a very languid circulation, they should, if profuse, excite deep concern, and if possible be checked. This is to be attempted by the exhibition of solid opium; by tannin dissolved in iced-claret, in the proportion of 3ss. to 3viij.; by an iced lemonade of elixir vitriol; by astringent gargarysms when the flow is from the mouth, and by the application of lunar caustic, when it takes place, as often happens, from leech-bites. These are the means on which the physicians of New Orleans and Mobile place most reliance. The acetate of lead has no doubt been used, but I have no information concerning it.

4. *The Suspended State of the Secretions.*—What might be said under this head has been in a great degree anticipated. In addition to the Ol. Tereb., already mentioned, the spirit of nitrous ether is valuable. As a means of reviving the action of the kidneys, perhaps a strong infusion of green tea (*thea viridis*), deserves a trial. Generally acceptable to the stomach, astringent and therefore antihemorrhagic, stimulating, containing a peculiar principle (theine) analogous to the fibrine of the blood, and acting on many persons as a diuretic, it would seem well calculated to be useful in the pathological state we are now considering. To assist the nitro-muriatic solution already recommended for the restoration of the functions of the liver, the cold infusion of wild cherry-tree bark (*prunus virginiana*), prepared

icement, suggests itself. But let us pass to the skin. All who ited yellow fever, have perceived the great importance of restoring itaining its functions from the moment when the heat and dryness age of excitement begin to abate until convalescence is far ad- In some cases the perspiration is in excess and requires to be re- by dry and harsh frictions with salted towels, or by hard spongings ited lemon-juice, vinegar, or the mineral acids. In this languid the cutaneous circulation, often accompanied with petechiæ and less of a purple hue with diminished temperature, in addition to ications just mentioned, strong infusions, or tincture of capsicum, ot, by friction, and the immersion of the feet in a similar bath, eat moment. In other cases the skin may be cool or of a natural ure, and dry, when a simple pediluvium, an increased quantity of ring, and the internal use of moderately-stimulating diaphoretics, d under our first head, are to be employed. In short the main- f the circulation, temperature, and moisture of the skin, in proper is of the utmost importance; as it not only diminishes visceral ns, but its reactive influence on the liver is decisive. But this cannot be met unless the patient be strictly confined to bed, and ce of his body, adequately, but not oppressively, covered.

iarrhœa.—*A bilious* diarrhœa need not excite apprehension or to active measures, as a restoration of the secretion of bile is followed by recovery. But when the discharges are watery, , or dark and sanguineous, its continuance is to be deprecated. the means of preventing or checking this discharge, the solution of olds deservedly a high place. Other astringents, as the tincture of in a cold infusion of cherry bark, will do good; lime-water and proper, solid opium should not be neglected, and amylaceous s, with vegetable astringents and laudanum, are not to be overlooked. out its continuance, as indeed during the whole of that stadium of ase to which it belongs, and whether it occur or not, the patient se a bed-pan, and on no account rise to the close stool.

ack Vomit.—While several if not all the pathological conditions we sidered are the causes of others, black vomit cannot be regarded use of any other, or of the mortal termination of which it is but ursor. A patient dies with or after black vomit, but not from it. ot regard it in any other light than the expression of a pathological t is, in general, fatal. To prevent black vomit is to accomplish the hich have been reviewed, to cure black vomit is to cure the morbid on which it depends, which we had not been able to prevent, and but the confirmation or full development of the third stage of the t is one of the great peculiarities of this fever, that it always before signalized by the production of this revolting material. It is not, re, always thrown up in fatal cases, but as far as *post-mortem*

researches have extended, it has in such instances been found either in the stomach or bowels. In some instances the patient expires in an hour or less after the first ejection of this fluid, in a few he has lived two or three days. The number of recoveries (as we have already stated) after the appearance of this symptom, varies in different epidemics, but on the whole seems to be increasing; either from a change in the character of the fever, or from improved methods of treating its final period.

As already stated black vomit is ejected without nausea by a sudden and spasmodic eructation; an action of the diaphragm not very different from that which constitutes the hiccough so often its associate. It is also occasionally discharged from the bowels and kidneys, and Dr. Levert has seen it exuding from the inside of the cheeks. Although in most cases the vital forces of the circulation are greatly reduced when this symptom comes on, instances are not wanting of its supervening when the patient, improperly, was dressed and walking about. Other anomalies attend occasionally on this state, indicating a kind of revived excitement in the brain and nervous system of animal life. Thus the patient may be rather deliriously imaginative and playful, so as to amuse himself with this ejection; or delivered over to venereal desires and orgasms only a few minutes before he expires. It would seem almost futile to speak of the treatment of this stage of the disease, which with every physician is, in fact, but a part more or less modified of the treatment already detailed. Some cases not subjected to any treatment have recovered, suggesting the idea that others, said to have been cured, would in reality, if left to nature, have terminated in the same manner. Nevertheless, I shall enumerate some of the measures which have been thought to do either good or harm in this state.

Dr. Ticknor saw the hiccough attendant on this stage removed by opium and the bicarbonate of soda with a plaster of pitch, opium, and camphor, between the shoulders. He stopped one case of black vomit and saved his patient by charcoal alone. To another he gave eighty grains of calomel and afterwards charcoal with oil of turpentine, and administered injections of mucilage, lime-water, and balsam copaiva. Recovery followed. Dr. Hulse has seen the turpentine arrest the black vomit, but still his patients did not recover after that symptom was fully developed.

Dr. Fearn, Dr. Ross, and other physicians of Mobile treat this stage with tannin dissolved in claret. Dr. Lopez of the same city has found stimulants injurious, and relies on ice by the mouth, and ice-water injections. Dr. Meux, of New Orleans, relies on ice and London porter. Dr. Jones of the same city gives ice and ale. In 1841, Drs. Mackie and Campbell had eight recoveries, in their Circus Street Infirmary, after black vomit appeared. The patients were treated with a stimulating liniment, epigastric bleeding, and porter internally. Dr. Stone has seen black vomit stopped by magnesia, also by sulphate of quinine with alkaline carbonates, but prefers to

rything else the sulphate of morphine with those carbonates, in connec- with ale or porter, at the same time giving injections of broth with sul- te of quinine.

Many physicians do nothing in this stage of the fever, believing it better leave the cases to nature than to irritate the stomach with medicines.

With these citations I close the treatment of yellow fever.

CHAPTER XI.

MISCELLANEOUS OBSERVATIONS.

SECTION I.

MORTALITY.

No fact in the history of yellow fever is better ascertained than that the elative mortality in different seasons is not the same, in which respect it nt conforms to the law of all epidemic diseases. In some years it strongly nds to death under every mode of treatment, in others to recovery under ethods equally diversified. These are inherent tendencies dependent on ndiscovered causes, and while they baffle, may be said to justify the pro- ession. Even a discovery of these occult influences would not, in all pro- ability, change the results of practice. I have already intimated that me of our physicians believe that the disease has been progressively as- uming a milder character. If so it may at last cease to be the terrible courge which it has hitherto been; or making a circle it may again recover s lost malignity. But may it not be, that a diminished mortality in atter times is the effect of improved modes of practice? That the practice as been to a certain extent *altered* if not *improved*, is quite certain, and he changes are in part negative, in part positive. Of the former the most important is the abatement in the mercurial, emetic, and purgative practice. Immense doses of calomel are no longer administered; the por- tion is now reckoned by grains, instead of scruples or drachms, and in the practice of many physicians, this medicine has been entirely replaced by the blue-pill. Emetics, notwithstanding the apparently well-founded encomiums of Dr. Cartwright twenty years ago, and the deservedly high authority of that gentleman in the South, are in latter years but seldom administered; while drastic cathartics, and above all their daily repetition, are no longer thought of. The changes of a positive kind which have been introduced consist chiefly in a more frequent resort to local bleeding; in greater reliance on injections, as a means of opening the bowels; and on the introduction into practice of the sulphate of quinine, as a substitute for the bark employed

excessive medication of any kind are thus averted.

In proof that the diminished ratio of mortality may be justly to the causes which I am attempting to assign, we have the foll tistics of the Charity Hospital of New Orleans. In the years 182 and '33, the admittances were 1783 and deaths 931, giving a m 52·21 per cent.; in 1839, '41, '42, and '43, the number admitted of deaths 1747, equal to 47·70, affording a diminution of 4·21 i of mortality in the average period of thirteen years. Now it w this period that the change from a violent to a milder treatment t

In attempting to assign the rates of mortality in this fever, almost insuperable are encountered. The greater number of cas epidemic, when we exclude the army and navy, are treated in pr tice, and a large majority of our physicians keep no records of t There is, moreover, much uncertainty in the diagnosis of cases not prove fatal; inasmuch as the disease prevails in the same lo the same time, and with symptoms which, in cases not running on hemorrhage and black vomit, do not always distinguish it in a s manner, from our autumnal remittent fever.

In the epidemic of 1833, Dr. Barton lost one out of 12·5; an ris, one out of 20. In that of 1839, according to the Commi (French) Medical Society of New Orleans, of 490 cases, 34 die one out of 14.

I have already stated that the Committee of the Creole Medi of New Orleans declare that the deaths in their practice, in the e 1839, were as one in fourteen. Dr. Campbell informed me tha he lost one in eight; Dr. Stone, that in the same year he had in l practice, fifty cases before he lost a patient; he then lost four in How many he had in all I did not learn. According to Dr. Le

sacola. At the same hospital, as Dr. Hulse informs us, 18 cases were received from two French vessels, La Sabine and Le Dunois, of whom two died, or one in nine; but on board, immediately before, 5 out of 14 had died, or one in 2·8.

In 1841, 156 were admitted into the same hospital, of which, according to Dr. Hulse, 13 died, making 1 in 12. In the same epidemic, the admission into the Maison de Santé of Drs. Stone, Kennedy, and Carpenter, New Orleans, were 272, of which 63 died, making one in 4·15.

In the Charity Hospital, in sixteen years, the only ones in which the deaths were accurately registered between 1818 and 1843, the number of patients admitted was 7,263; of whom 3,635 died, or one out of two. Thus we find the mortality of yellow fever ranging from this high ratio of one-half, or fifty per cent., to one in 26·3, or 3·8 per cent.

If we bring together all the available data in this statement, we have patients, 9,349, deaths, 4,023, giving as a general average one death for 2·323 cases, equal to 43·04 per cent. If we detach from these amounts the patients of the Charity Hospital, we have 2,084 patients and 388 deaths, which gives one in 5·32, or 18·8 per cent. The mortality then in private practice is to that in the Charity Hospital as 18·8 per cent. to 50 per cent. In other words it is less than two-fifths.

The differences in the ratio of mortality in private practice, may be in some cases owing to differences in practice, in others of diagnosis, [in some, of previous habits, Ed.] and in others of years. The high ratio of deaths in the Charity Hospital, compared with private practice, and that in the ships, the Naval Hospital at Pensacola, and even the private hospital in New Orleans, must be ascribed to the character and condition (when brought in) of its patients, seeing that it is an exceedingly well-ordered establishment, and is attended by the same physicians that practise in the city. Those who are seized on board the ships, and those admitted into the Naval Hospital, being under discipline, received early attention, and many of those who seek the Maison de Santé, are strangers in comfortable circumstances; but of the poor and isolated who are taken to the Charity Hospital, a large proportion are far advanced in the disease when carried thither; are often sent there, indeed, that they may be buried at the public expense. Not a few of them, moreover, are dissipated persons, who, although not more liable to the disease, perhaps, than others, are well known to be more liable to die from it.

SECTION II.

COMPARISON OF YELLOW FEVER WITH AUTUMNAL FEVER.

In various places through the preceding chapters on yellow fever references have been made to autumnal fever, but, I now propose to institute a

comparison between them. Materials for this are furnished in the histories which have been given; and it only remains to bring them together. This, to a limited extent, has been done by Dr. Hulse in his monograph; and with more copiousness, but less concentration, by Dr. Lewis in his valuable memoir on the yellow fever of Mobile, both writers coming to the conclusion that they are distinct diseases. In my intercourse with the physicians of the South, I have ascertained that nearly all of them concur in that opinion. Many have, indeed, favored me with oral comparisons of the two fevers, among whom, I should designate Dr. Meux and Dr. Hester of New Orleans, and Dr. Hicks of Vicksburg, whose conclusions are entitled to the greater confidence, from the fact, that they are perfectly familiar with the endemic fevers of Alabama and Mississippi, as well as the yellow fever of the cities in which they reside.

TABULAR VIEW.

AUTUMNAL FEVER.	YELLOW FEVER.
GEOGRAPHY AND CHRONOLOGY.	
1. Prevails from the tropic to the latitude of 44°, and is often epidemic and mortal as far north as 43°.	1. Prevails from the tropic to the latitude of 35° or a little higher; but has occurred only once above the latitude of 32°.
2. Occurs much more frequently in the country than the towns; and is as prevalent and violent in towns remote from, as those on the banks of the Mississippi River.	2. Almost limited to the cities and towns, and far more frequent in those on the banks, than those remote from the Mississippi.
3. Occurs sporadically every year, and rises annually into an epidemic, in some part of the region in which it prevails.	3. Generally appears as an epidemic, but is sometimes sporadic.
4. Scarcely ever appears in ships navigating the Gulf of Mexico, especially in its intermittent type, while they continue at sea.	4. Often breaks out on board of ships, while out in the Gulf.
5. Very commonly begins in June, never deferred beyond July, in which month it often becomes epidemic; prevails greatly in August, sometimes even diminishing in September, at others keeping up and prevailing through October and November. Reigns from three to four months.	5. Rarely commencing in June, and scarcely ever more than sporadic in July; often deferred till August even in New Orleans, and till the 10th or 15th of September in the smaller towns, further north. Most prevalent in that month and October. Reigns from two to three months.
6. Relapses well characterized or obscure and insidious throughout the winter,	6. After convalescence is completed, relapses, now and then, before the setting

ed, sometimes to an epidemic
n spring, under the name of Ver-
rmittents.

in of winter; none afterwards, open or occult, and no return the following spring.

SUBJECTS.

7.

s native children and youth, not
n the immigrant; bestows no im-
from subsequent attacks, but
eems in many cases to invite or
se to them; continues therefore
n annually in insalubrious locali-
l it has permanently destroyed
titutions of those assailed. Does
ck all strangers from higher lati-
Does not give an exemption from
fever.

7.

Affects children born in the towns where it prevails, so slightly, as in most cases to pass unobserved, or does not affect them at all; but, when they grow up, they are found to be exempt. One attack, especially during a violent epidemic, bestows an immunity from future attacks, unless the individual should reside for several years in a colder climate. Scarcely suffers any strangers to escape. Does not exempt from autumnal fever.

SYMPTOMS.

8.

k generally gradual; first parox-
ld, with an ingravescent cha-
Essentially paroxysmal, and
ing either a remission or an in-
ion. Often of a tertian type,
es a double tertian, rarely a dou-
tidian. May prove fatal in three
days, but shows no tendency to
ven within a much longer period.

8.

In most cases sets in without premonitory ailments of any kind. Often violent on the first day. Does not necessarily manifest a paroxysmal, and never a true intermittent type. Fever generally ceasing, not to return, in forty-eight or seventy-two hours.

9.

cold stage of many intermittents
prolonged, and dangerous. The
-heat in many remittents, during
ge of excitement, very intense.

9.

The cold stage not often severe or prolonged. The surface-heat in the stage of excitement not particularly intense and sustained.

10.

secretion of bile often profuse in
rly stages; the jaundice of the
tages not always manifest or deep.

10.

The secretion of bile small or suspended throughout the disease, and the jaundice of the latter period, or after death, in general very conspicuous.

11.

tongue, in most instances, heavily
with a white or yellowish fur in
rly stages.

11.

The tongue variable in appearance and often quite natural.

12.

s in the head, back, and limbs not
larly violent in most cases, and
y quite moderate.

12.

Pains of the head, back, and limbs in almost every case excruciating.

13.

ric irritability occasionally great,
majority of cases, however, not
s to cause much vomiting. The

13.

Irritability of stomach a prominent symptom almost from the beginning. In many cases uncontrollable vomiting. In

stomach generally tolerant of medicines.	the progress of all, great intolerance of medicines and drinks.
14.	14.
The blood often sizy in remittent cases, and always coagulating firmly.	The blood generally deficient in size, and in most cases the coagulum soft and tender.
15.	15.
Hemorrhages exceedingly rare in any stage of the disease.	Hemorrhages a characteristic symptom—often commencing in the hot stage—scarcely ever absent in the last stage of bad cases.
16.	16.
The secretion of urine not more suppressed than in the ordinary phlegmasiæ.	The secretion of urine very often greatly reduced, sometimes entirely suspended.
17.	17.
The discharge of a dark-colored fluid from the stomach, even in fatal cases, a rare phenomenon.	Black vomit an almost universal precursor of death; when none is ejected, generally found in the stomach or bowels after death.
18.	18.
In fatal intermittents, the patient does not die in the intermission, but during the paroxysm. In fatal remittents, dies on the cessation of febrile action, which in many cases assumes a typhoid type for some time before death.	Runs a course of two or three days, when the febrile symptoms cease, and the patient lies as if in the apyrexia of an intermittent, for an equal, a shorter, or a longer period, without any recurrence of fever, when he either dies with black vomit, or rapidly convalesces. Scarcely ever displays a train of typhoid symptoms.
TREATMENT.	
19.	19.
The sulphate of quinine administered in the intermission, or after free bleeding, in remittents, puts an end to the fever. Can avert a fatal termination.	The sulphate of quinine, given on the decline of the hot stage, does not avert a fatal issue, except in those epidemics which display an intermitting character.
PATHOLOGICAL ANATOMY.	
20.	20.
Lesions of the spleen common, and highly characteristic,—of the gastro-enteric mucous membrane, less frequent.	Lesions of the spleen rare. Of the mucous membrane of the stomach or bowels exceedingly frequent.
SEQUELÆ.	
21.	21.
Jaundice, dropsy, hemicrania, and other intermittent neuralgias, with enlarged spleen, common consequences.	Sound health, often an improved state of the constitution generally follows an attack.
MORTALITY.	
22.	22.
Not self-limited, and subject to arrest by known treatment, if employed in due time. The mortality in private practice	Self-limited; susceptible of mitigation or aggravation by art; in private practice, private and naval hospitals, and on

s not known; that it is small may, however, be surmised from the statement made in Book II. Part I. Chapter X. According to the reports of Charity Hospital, stated in Book II. Part II. Chapter II., the mortality is one out of ten.

ships, taken together, the rate of mortality, as we have just seen, one out of 5·320; the same in connection with the Charity Hospital, one out of 2·323; in the Charity Hospital alone, one out of two.

These diversities appear to mark autumnal fever and yellow fever as distinct diseases, depending on different remote causes. These causes, however, sometimes seem to act on the system at the same time, reciprocally modifying each other's effects. In this there is nothing incredible or peculiar to them. In the year 1834, at Cincinnati, the characteristics of epidemic cholera were intimately blended with those of autumnal fever; and as I have already stated, that fever is often modified by a typhous constitution of the atmosphere. In the year 1832, yellow fever and epidemic cholera, according to Dr. Halphen and other physicians of New Orleans, were manifestly blended, although their remote causes were as manifestly very distinct. With such ascertained facts to guide us, the conclusion seems almost irresistible, that intermittent yellow fever is a hybrid.

PART THIRD.

TYPHOUS FEVERS.

CHAPTER I.

INTRODUCTION—GENERAL EPIDEMIC TYPHOUS CONSTITUTION.

SECTION I.

INTRODUCTION.

I. Our physicians, from the Gulf of Mexico to Lake Superior, or at leas to the northern limits of autumnal fever, are familiar with the train o what, in their common parlance, are called *nervous* or *typhoid* symptoms, fol lowing, now and then, on cases of that fever; which, beginning with a remit ting, ends with a continued type. We are all moreover witnesses o the fact, that in some autumns a much greater proportional number of such cases occur than in others. In these secondary affections, we have the archetype, as far at least as symptoms are concerned, of the primary forms o fever, which we are now about to study.

II. These forms, known under the name of typhus mitior, typhus gra vior, and typhoid fever, which I shall group together under the term Typhous Fevers, are likewise met with from the Gulf to Hudson's Bay, ex tending many degrees further north than our autumnal fever. Indeed they seem more especially to belong to the North than to the South. Their base line may be said to be in a high latitude and elevations, as the base line of autumnal fever, and yellow fever, is in a low latitude and near the level of the sea, and, as we advance to the south, they become rarer, just as the latter fevers become rarer in advancing to the north. Nevertheless they do not appear actually to cease even at the Gulf of Mexico; and may be said therefore, to possess a greater geographical range than our autumnal endemic or periodical fevers.

III. Typhous fevers resemble autumnal fevers in appearing either dically or epidemically; and invading both town and country, lik autumnal and yellow: they are not limited to a particular portion of th that between the summer and winter solstice; but occur, though une

in every season. On the whole, however, they are most prevalent in autumn and winter.

IV. For the phrase typhous fevers as a generic expression, there is no difficulty in giving a definition by the symptoms; but when we would construct species and assign either symptomatic or pathological characters, the task is very different. The common distinction into typhus and typhoid fever, when a systematic writer attempts to assemble and place side by side the characteristic symptoms of each, is not very obvious; and even when the diagnosis is reserved till a *post-mortem* inspection is made, the conclusion is not always satisfactory. Of course then the historian who has of necessity to be guided by the facts which are presented in the reports of our physicians, will in many cases be quite unable to say, whether the epidemic he is describing should be denominated typhus or typhoid. Nor can it be, I suppose, of much practical importance under which head he arranges them. Modes or varieties of fever which resemble each other so closely in the circumstances under which they prevail, their symptoms, and the treatment they require, as to render a distinctive diagnosis difficult, can scarcely be regarded in any other light than as mere varieties; and, although, when well characterized, it may be very proper to designate them by different names, we should not forget, that the terms employed express mere varieties; as the words quotidian and quartan indicate varieties of intermittent fever and inflammatory and congestive varieties of remittent autumnal fever. With this view of the difficulties of the case I shall regard synochus adynamic fever, typhus mitior, typhus gravior, and typhoid fever, as constituting a natural group; and while in the course of this article I may frequently employ each of these terms, I shall generally designate the whole or any part by the adjective *typhous*. We shall in vain seek for a term more expressive of the pathological condition of the functions generally, in these forms of fever, than that which presents the vital properties of the organism, as *stupefied*.

V. Typhous fevers cannot be confounded with any of the forms of autumnal fever when both are well developed. Those which are denominated malignant or congestive, although as fatal as the most destructive typhous fevers, manifest themselves by very different symptoms; nor does yellow fever approach, in its phenomena, with the single exception of its continued type and its hemorrhages, any nearer to the true typhous character. They cannot, moreover, be identified with the veritable eruptive fevers, notwithstanding many cases present an eruption, or what in common language is called so. Still all the fevers which have been enumerated are found to be modified by what is called typhous atmospheric constitution; which is likewise true of pneumonia and other phlegmasiæ.

VI. Were the plan and objects of this work those of a systematic elementary treatise, equally applicable to all countries, a chapter on typhous fevers might be constructed out of published facts, which are the common property of the profession, in connection with the experience of the author; and

its excellence would be according to the extent of his researches, his care in the selection of facts, his skill in their arrangement, and the correctness of his deductions. Such a work would be proper for the pupil while engaged in the study of special pathology and therapeutics, not less than for the practical physician. My object, however, is to present these fevers as they prevail in the Interior Valley, by the light of their own phenomena; and the results of the treatment by which they have been met: yet I propose to borrow from other countries such facts as may supply deficiencies in their etiological, pathological, and therapeutic history.

In treating of autumnal intermittent, remittent, and yellow fevers, the facts and observations furnished by our own country were nearly sufficient for a full history, including all the methods of treatment found efficacious elsewhere; but as typhous fevers are less endemical with us than the fevers just named, it will be necessary, in attempting to meet the requirements of practice, to increase our references to the foreign works. It will be my aim, however, so to use the exotic, as to give the indigenous as much prominence as possible.

In proceeding to the execution of this task, there are two modes which may be pursued: first, to combine the facts presented by our original observers, whether in print or in my own manuscript collections, into a systematic treatise; or second, to give the whole of the different accounts, and then to subject them to the proper generalisation. I have adopted the latter mode, believing it best fitted to show the influence of our climates, soils, and states of society on the production and character of these fevers, objects which I desire constantly to keep in view.

VII. Before closing this introduction it may be useful to give an extended group definition of the fevers we are about to study. Typhous fevers are sometimes sporadic, but more commonly epidemic; in general the epidemy is local; occasionally extensive. The forming stage, with a few exceptions, is protracted and characterized by signs of debility in the organism at large; the stage of reaction shows a continued type, and, with evening exacerbations, may continue for forty, sixty, or even ninety days; the appetite is impaired, and the bowels sometimes torpid, are in most cases irritable, with a tendency to diarrhœa; the discharges seldom show increased, often diminished secretion of bile, and are extremely fetid; the tongue becomes dry, and sordes collect on the front upper teeth; the pulse is unnaturally frequent and rarely tense; the heat of the surface is sometimes burning, and the cheeks flushed; the eyes become dull and occasionally bloodshot; drowsiness sooner or later supervenes, with mild, and muttering delirium: coma is almost universal; subsultus tendinum, especially of the arms, manifests itself, with efforts to catch and grasp imaginary objects: sudamina, petechiæ, and rose-colored maculæ, frequently appear; borborygmus is common, and a tympanitic condition of the bowels occasional; early bleeding from the nose may happen, and there is sometimes

is hemorrhage from the bowels; in many cases, inflammation of the ines, lungs, or brain, becomes associated with the fever. When these oms, or a majority of them, are present, the fever is typhus; when no form of disease has preceded it, the fever is an original typhous; when sease began as an autumnal remittent, an eruptive fever, or a phleg-, the symptoms which have been enumerated indicate a secondary us; or what has long been called the typhoid stage of the primary e.

II. Our typhous fevers, as already stated, generally occur as local nics. I have witnessed but one general prevalence—one wide-spread- d enduring typhous atmospheric constitution; and before proceeding ak of local and limited visitations, I propose in the next section, to an outline of the chronology, geography, and character of that in- .

SECTION II.

A GENERAL TYPHOUS EPIDEMIC CONSTITUTION.

might be expected, the area of the Interior Valley is so extensive, s yet no true and unmixed typhous contamination of its whole atmo- e has ever occurred. The only approach to it was that which in its ss generated the pneumonia typhoides of 1813 and 1815, and did not ly cease till several years after the latter period. Let us take a view progressive chronology, geography, and modifications.

what might have occurred among the scattered settlements of the region stretching from the shores of Lake Ontario to the delta of the ssippi during the first ten years of the present century, we know very as the physicians of those infant communities have left but few memo- behind them within that period. According to the medical historians w England, a malignant or pestilential epidemic began in the basin Connecticut River, in the state of Massachusetts, in the open town of ld, about the latitude of 42°. It was first observed in the month of , 1806. To show its typhous character I shall give an abstract of its oms as then observed by Drs. Danielson and Mann.*

Without any apparent predisposition, the patient is suddenly taken with t pain in the head and stomach, succeeded by cold chills, and followed usea and puking; matter discharged from the stomach of no unusual rbid appearance; respiration short and laborious; tongue a little toward the root, and moist; velocity of the blood increased, with a ensible diminution of momentum in the radial, while in the carotid s, it was much augmented; and in a child of fifteen months old, a

* atment on a malignant epidemic commonly called Spotted Fever.—By Elisha North, p. 90.

very violent pulsation was discovered at the fontanelle (opening of the head); the eyes have a wild vacant stare, without much, if any appearance of inflammation; the heat of the skin soon becomes much increased, yet the skin is not remarkably dry; these symptoms are accompanied by a peculiar fearfulness, as if in danger of falling from the bed or the nurse's arms, and continue from six to nine hours, when coma (suppression of sense and voluntary motion) commences, with increasing debility; extremities become cold; livid spots, resembling petechiæ (purple spots, which appear in the last stages of certain fevers) appear under the skin, on the face, neck, and extremities; pulse small, irregular, and unequal; spasms occur at intervals, which increase in violence and frequency in proportion as the force of the circulation decreases; at this time the eyes appear glassy, and the size of the pupil varies suddenly, from almost wholly obliterating the iris, down to the size of a millet seed, and then again as suddenly dilating. These symptoms seem to mark the second period of the disease, and continue from three to five hours. The third and last stage is distinguished by a total loss of pulsation at the wrists; livid appearances become more general, spasms more violent; coma more profound; death! The patient has in general continued in the last stage from six to twelve hours."

Early in the following year, 1807, the epidemic made its appearance in many other towns of Massachusetts and Connecticut; and it may not be unprofitable to transcribe an account of its symptoms, as it occurred in the county town of Winchester in the latter state. According to Dr. Woodward they were as follows:—*

"Young people under the age of twenty, were most liable to it; and among adults, females are more liable than males. No age nor sex, however, were free from the attacks; it assumed, in different subjects, all grades of disease, from a mild fever to a perfect plague. The symptoms were various, according to its inveteracy. It attacks with lassitude, chills, great prostration of strength, eyes red and watery, pupils dilated in some cases, in others small, like dying persons'; often delirium, with exquisite pain in the head; great anxiety at stomach, with tossing of the body; nausea, and often a troublesome vomiting; a pain and lameness in some of the limbs often ushered in the disorder; there was a soreness of the flesh, and generally spots on the skin, the size of half a common turkey-shot, were scattered over the body, resembling blood-blisters; likewise, efflorescences, of various sizes and shapes, in different parts, which were dark or florid; and a dark or light color of the spots and efflorescences gave a clue to a favorable or unfavorable prognosis. The darker the more dangerous. In some, after the chills, there was *great heat, which was of the thrilling, stinging kind. The pulse, like other symptoms, was various, sometimes considerably full, but generally very weak, quick, and irregular. The disease sometimes in this season, assumed the inflammatory type*, sometimes the synochous, but gene-

* Treatment on a malignant epidemic commonly called Spotted Fever.—By Elisha North, p. 112.

ally the typhous. The violent symptoms were great lassitude, with universal ains in the muscles; chills; *heats, if any, were of very short duration;* unsual prostration of strength; delirium, with severe pain in the head; vomitg, with indescribable anxiety at the stomach; eyes red and watery, and lled up, and the head drawn back with spasm; pulse quick, weak, and regular; petechiæ and vibices all over the body, and a cadaverous countenance and smell: death often closed the scene in ten or fifteen hours after he first attack; some, however, survived all these symptoms; those who ied appeared to sink away under the load of disease, became cold and low, nd died comatose, with all the marks of general mortification; others went ff suddenly, apparently apoplectic. The body, near the fatal period, and oon after, became as spotted as an adder, and demonstrated a general dissolution of the fluids. Those who survived these symptoms appeared to owe their life to a very liberal use of strong stimulants and tonics; and when the vital flame began to be rekindled in the system some grievous external affection most certainly appeared, such as inflammations of the joints, like the acute rheumatism, or an erysipelatous affection of the skin, or racking pains, without any morbid external appearance, convulsions, spasms, &c. Those external affections often proved very lingering and tedious, and in some instances quite exhausted the patient. This, however, generally proved a manageable state of the disease, and rather to be desired than feared."

In the following spring and early summer (1808), according to the same author, the disease invaded many other towns of the states just mentioned, with symptoms considerably different.*

"An eruption on the skin so seldom appeared, that it could no longer be considered a characteristic symptom of the disease. Those spots, the size of half a shot, resembling blood-blisters, have not appeared in those cases which I have seen; and those inflammations of the joints above mentioned are now seldom noticed. All the attacks for a year past, which I have seen, are of the low typhous kind."

Continuing to reappear every fall, winter, or spring, of the years 1809, '10, '11, and '12, it scourged various parts of New England and New York. In the two or three latter years, but especially in the last, it underwent a change of character, which led some physicians to regard it as having been superseded by a different epidemic constitution, a conclusion, however, to which I cannot assent. This change procured for it a new appellation—pneumonia typhoides. Even as far back as 1810, at one locality in Vermont, it was denominated malignant pleurisy,† and in 1811, Dr. Hazeltine, of the state of Maine, saw it assume the character of "malignant pneumonia."‡ It was not, however, till 1812, that the pneumonia complications became general. In that year, the physician just quoted saw both diseases prevailng at the same time, and running into each other in such manner as to

* Ibid. p. 118. † Am. Med. & Phil. Reg. vol. iv. p. 38. ‡ Med. Repos. vol. xviii. p. 26.

present every intermediate grade between the violent cerebral symptoms of spotted fever on the one hand, and the equally severe pulmonary symptoms of pneumonia typhoides, on the other.

With this change of character came an increased impulse of diffusion, and in the autumn of 1812, the epidemic, overleaping the mountains and highlands which had hitherto kept it on the Atlantic plain, fell upon that of the interior, and thenceforward became one of the diseases falling properly within the sphere of this work. Its entrance within our prescribed geographical limits was by Lake George and Lake Champlain, in the western part of Vermont, and the northeastern corner of New York. Its invasion of the Great Valley, in that memorable year, was not, however, limited to those sections, and leaving them for the present, let us inquire into its development in other parts.

In a valuable inaugural thesis,* Dr. Ludlow has embodied, with his own observations, those of Drs. Carter and Vanderburgh, of Geneva, and Dr. Hayes, of Canandaigua, Western New York, on the epidemics of that region, through a long series of years.

The settlement of that country commenced about the year 1791, and up to and including 1805, the fevers seem to have been intermittents and remittents, exhibiting but little tendency to a typhous character. But in December, 1806, a fever of a typhous character broke out at Palmyra. It generally proved fatal in three or four days, being attended in the beginning with great prostration, and near the close, with coma, subsultus tendinum, and hiccough. In the summer of 1807, the fevers were inflammatory, but in autumn assumed a typhous form, and manifestations of an epidemic constitution of that kind were made in various parts of that region. For the first four months of the following year, 1808, a typhous fever continued to prevail, and for the remainder of the year, the fevers generally assumed a continued type. The fever of 1809 showed but little inflammation, and readily assumed the form of a mild typhus. Throughout 1810, the fevers had nearly the same character, but were less prevalent. In 1811, the manifestations of a typhous constitution appeared to be suspended by an extremely warm and dry summer, generating bilious fevers. The following winter, 1811–12, was intensely cold, and pneumonia was among the prevalent diseases. In the month of March, 1812, pleurisy exhibited a great variety of characters, and often demanded the most opposite treatment. In the months of April and May, a few sporadic cases of pneumonia typhoides (the first ever known in that quarter), presented themselves, and after suspension during the summer, reappeared in autumn, affecting the people, but more especially the troops, at Lewistown, on the Niagara River. In the months of January and February, 1813, the disease became general throughout that region. On the access of warm weather, the epidemic ceased, but

* Observations on the Lake Fever and Other Diseases of the Genesee Country, in New York, 1822. By E. S. Ludlow.

ed with mitigated violence the ensuing winter, 1814–15. In the of 1815, it disappeared. The remainder of that year, and the ar years 1816 and most of 1817 were free from typhous diseases; the autumn of the latter, a "fever with typhoid symptoms prevailed mited extent," and recurred in December, 1818. From that time to when the chronicle terminates, no typhous affection occurred.

must now turn to another part of the Valley, and trace out the rise rogress of the epidemic distemperature.

opportunities for personal observation (as a student of medicine at nati), began in the year 1800, twelve years after its settlement. Of idemic diseases during those years, I have but little information. Dr. n, who had been surgeon-general of the armies of St. Clair and Wayne, headquarters were here, informed me that there had been but one us epidemic constitution from the second winter of the settlement of wn, and then it lasted for that winter only. From 1800 to 1808, the al type of fever in the town and surrounding country was intermittent emittent, occasionally, as everywhere and in all autumns, presenting which assumed a typhoid character. But a change of epidemic con- ion, a new atmospheric contamination, was at hand. In the month of nber, 1809, a typhous fever—some cases of which corresponded suffi- y well with the typhus gravior of Cullen, while the majority resembled nochus or typhus mitior, broke out in the western part of the town, n several instances proved fatal. In January, it continued to prevail, lmost every form of disease appeared to be modified by it. Diarrhœa emorrhages from the bowels were common symptoms, the pulse was ally soft, subsultus tendinum, coma, and muttering delirium were fre- ; a few cases presented petechiæ, and a greater number sudamina, sometimes assumed a purulent aspect. A strong tendency to gan- in the blistered surfaces was common. In many instances there was ifest affection of the lungs.

ter the month of January, scarcely any cases occurred till the follow- ugust, 1810. In September new cases appeared, and in October, I fatal case that from the beginning was attended with the rare combi- n of diarrhœa, cough, and difficulty of breathing. Although the blood was sizy, the pulse and general strength of the patient sunk rapidly its loss. In short, it was a well-marked specimen of pneumonia ty- s. Cases of a typhous character continued to occur in November and nber. The early part of the next year, 1811, brought forth a number es of the same kind, but the months of May, June, and July, were t. In August the disease reappeared, and continued to occur to the end year, in both town and country. In the early months of the next year, cases still occurred, but in the spring the disease ceased, and did not ar till August, when occasional cases began, and continued to recur ghout the remainder of the year. During this time, a typhous fever

prevailed more or less in the army of General Hull at Detroit. In the month of September, an officer, Lieutenant Mansfield, seized as he was returning home, in this city, after the surrender of the army, died with the characteristic symptoms of a typhous fever. At several of the posts between this place and Detroit, a typhous tendency was manifest. The first four months of 1813 presented cases of the same fever complicated with pulmonic inflammation, which required the lancet, but again it abated till August, when it recurred with more violence and mortality than in its outbreak in 1809; affecting moreover a much larger number. This state of things continued to the end of the year. During this period many dangerous pulmonary affections occurred, a number of which, in the adjacent country, were of an alarming nature. In fact these were cases of pneumonia typhoides, which established itself in the country before it did in the city, although the epidemic typhous constitution appeared first in the latter.

Thus the epidemic, which, as we have seen, reached the shores of the Lakes Ontario and Erie in the winter of 1812–13, did not begin on the banks of the Ohio till that of 1813–14. Its prevalence, moreover, was not then very great, and in the following summer it nearly ceased. In the winter of 1814–15, however, it returned with violence, and was really epidemic.

In the years 1818 and 19, many cases of typhous fever occurred at Cincinnati, as in the Genesee country, since which no epidemic constitution of that kind has occurred in the city.

By a communication from Dr. Hildreth, of Marietta, in this state, I learn, that from 1812 to 1820, a "typhous atmospheric constitution" prevailed in that town and the surrounding country. In the spring and summer, the disease took the form of typhus mitior; in autumn and winter, it often appeared of a malignant character, approaching the typhus gravior of Dr. Cullen. The former was generally manageable—the latter commonly fatal, from implicating the brain.

At Shepherdsville, Kentucky, N. L. 38°, the epidemic made its appearance in the winter of 1813 and 14, and prevailed as an epidemic till the ensuing June. In the following winter, the fever reappeared, but was only sporadic.*

I spent the year 1806, in Mason County, Kentucky, and witnessed a local epidemic in the village of Mayslick, where fevers of every kind had from its first settlement been extremely rare. Most of the cases, in the beginning, were marked with remissions and bilious discharges; but the fever did not commence till after the usual time of the onset of periodical fever, and continued till December. Moreover, nearly every case was marked, in its latter stages, with the symptoms of typhus, showing that the epidemic constitution which had then begun with so much violence in New England, was, also, forming in the West.†

Having traced out the development of this epidemic on the banks of the

* On the Med. Top. of Shep. By W. Jewell, M.D. p. 29. † Barton's Journal for 1808, p. 88.

hio, in the latitude of 39°, let us go further south. Dr. Kerr* informs , that in the month of December, 1813, while a portion of the United ates Army was in the woods of Eastern Mississippi, some cases of the me fever occurred. The following winter he spent in Natchez, and, in the onths of March, April, and May, he saw several cases, some of which oved fatal in twenty-four, forty-eight, or sixty hours. When they con- nued longer, the type of the disease became decidedly typhous. In ebruary and March, 1815, the disease, displaying a still higher pneu- onic character, occurred in both town and country.

According to Dr. Huestis,† the epidemic began among the troops sta- oned in New Orleans, about the middle of April, 1814. It does not ppear to have been preceded by any other form of typhus fever, as in ew England, Western New York, and at Cincinnati; yet the Doctor re- arded it as having much in common with the spotted fever of the former, hile in the pulmonary lesions, it displayed a perfect identity with the neumonia typhoides, which began two years before among the troops on the orthern lakes, leaving no doubt that it was indeed the same epidemic.

I have thus traced out the rise, progress, and decline of the only general typhous constitution of the atmosphere, which has invaded the Interior Valley. The citations of authority are not so numerous as could be wished; but it is matter of tradition that all parts of the Valley were more or less affected, although the published accounts are so few in number. In many places besides Western New York and Cincinnati, the pneumonia typhoides was doubtless preceded by cases of simpler typhus, of which no history can now be obtained. It has been fashionable to regard pneumonia typhoides as inflammation of the lungs from cold, occurring in constitutions acted on by the cause of typhus; but we are scarcely justifiable in contem- plating the epidemic under that aspect; for the number of cases was much greater than the number of pneumonic cases before and after the reign of that epidemic, and in some years they continued to occur till near mid- summer, long after the season for pulmonary inflammation had passed by. We should, I think, rather regard the fever as having a strong tendency to localize itself in the lungs. In every place, however, cases occurred without any pulmonary complication.

I have spoken of this epidemic constitution as dying away about the year 1820; but this is not rigorously correct. The occult cause, it is true, might have become extinct, but its impression on the systems of the people seems, from the facts I am about to state, to have remained. It is well known as a part of the history of our periodical, or autumnal fever, that it is more prevalent and fatal over large tracts of country in some summers and autumns than others. Now of all the years which have elapsed since the first settlement of the Valley, 1821, 1822, and 1823, but especially 1822, were the most sickly. Cincinnati suffered, and boats returning from the

* Med. Rep. vol. xviii. p. 211. † Phys. Obs. and Med. Tracts and Research. of Louisiana, 1817, p. 143.

lower country constantly brought up cases of fever of obstinate and dangerous character. Dr. Hildreth, in the communication from which I have just quoted, observes: "The autumnal epidemic of 1822 was introduced by a number of cases of malignant typhus, attended with glandular swellings, mostly parotid; but after the bilious epidemic autumnal fever was fully established, every other disease disappeared before it." The towns along the Ohio River were at that time comparatively few; but all, or nearly all, suffered. The Swiss village of Vevay, Indiana, was nearly depopulated; and the capital of that state, Indianapolis, suffered in nearly the same degree.* Louisville, and the towns on the opposite side of the river, were severely visited—the first especially was scourged almost to desolation.† The state of Kentucky generally, but especially its southern half, was fatally invaded. Columbus, Mississippi; Cahawba, Alabama; Pensacola, Florida; Baton Rouge, Louisiana, all suffered in like manner. This is proved, as regards the two latter places, by the army returns, which also show that the sickness, "alarmingly mortal" at Fort Smith on the Arkansas, extended to Council Bluffs far up the Missouri.‡

These notices, which might have been introduced under the head of Autumnal Fever, come in more properly here, as they seem to show that the fevers of those years were the joint offspring of the typhous and the bilious epidemic constitutions. At least I know not of any other cause for the striking mortality of our autumnal fever during that period. The sulphate of quinine had not then come into general use in the Valley, and its control over autumnal fever was not fully understood.

CHAPTER II.

LOCAL HISTORIES OF OUR CONTINUED OR TYPHOUS FEVERS—SOUTHERN BASIN APPALACHIAN MOUNTAIN REGION.

SECTION I.

SUB-EPIDEMIC AND SPORADIC VISITATIONS.

I HAVE visited many portions of the Appalachian Chain, from the 43d down to the 34th parallel of latitude, that is, from New York to South Carolina inclusive. There are many crests and peaks which rise from 4000 to 6000 feet above the level of the sea; but the elevated portions are not inhabited; and the valleys and enclosed table lands, which are peopled, generally lie at an elevation varying from 1500 to 2500 feet. The higher declivities are, however, not without inhabitants, generally of the poorer classes, and

* See vol. i. p. 311, No. 4.
† Ibid. p. 249, No. 4.
‡ Stat. Rep. of the Sick. and Mort. U. S. A. 1840.

. It has been already stated,* that in this Alpine region, intermit-
ers are almost unknown; and that remittents tend to a continued
In fact, they may be said to assume a typhous character. The
secretion of bile, the distinct remissions, and the occasional trans-
n into intermittents, which they present in the same latitudes at a
vel are here seldom seen; yet the season of the year in which they
nost, August, September, and October, mark them as the climatic
nts of the remitting fever of the low, warm plains and valleys
the mountains and the Mississippi. They are sometimes arrested
reatment which cures the latter; but more commonly take a pro-
course, and display the symptoms which all concur in denominating

n addition to these sporadic, typhous, autumnal fevers, which con-
sort of connecting link between the periodical and continued fevers,
ntain localities are sometimes invaded with sub-epidemic typhous
few visitations of which I shall proceed briefly to describe. I begin
orth, for it seems as natural to proceed from the higher to the lower
in describing the continued fevers, as from the lower to the higher
ing the periodical.

SECTION II.

SUB-EPIDEMIC AT ELLIOTTSVILLE, NEW YORK.

is town is situated in a beautiful expansion of Great Valley Creek,
pens into the Allegheny River. A transparent little stream flows
it, but there are neither ponds nor swamps. True intermittent
ittent fevers are almost unknown, but sporadic cases of the latter
ting in a typhous stage occur every autumn.

rly that of delirium tremens. The eyes were occasionally red. In a or more, the coat of the tongue fell off, and the organ then assumed, a red and then a dark and dry aspect. Several patients had hemorges from the bowels after the second week. Few cases terminated till the third week, and many ran on till the sixth, eighth, or twelfth week, when they generally recovered. No maculæ were observed. Neither venesection nor the sulphate of quinine was found beneficial in the treatment of this fever. Gentle laxatives, diaphoretics, diluents, mucilages, cold applications to the head, blisters to the neck, and sinapisms to the abdomen, with brandy and capsicum in the advanced stages did best.

Young persons, males more than females, were the chief subjects of this fever. Dr. Stanton estimated the number of cases at 200 out of a population of 700. There were from 15 to 18 deaths; none of which were followed by a *post-mortem* inspection.

The onset of this epidemic was sudden and its spread rapid. It continued till the winter, and throughout that season violent changes of weather were immediately followed by new cases. To the south and north of this place it extended to the distance of 20 or 30 miles, and much further to the east, but I have not facts to complete its topographical history. No cause could be assigned for this epidemic—there was no evidence of its being imported or of its extending by contagion. Dr. Williams had resided in the place 15 years before this visitation, and informed me that it was the first. When I was at the place four years afterward, it had not been repeated.

SECTION III.

SUB-EPIDEMIC AT PARISBURG, VIRGINIA.*

I. WHEN at Parisburg in 1850 I was informed by Dr. Peck and Dr. French, that a fever of a continued and typhous character had prevailed for several years in Tazewell County, adjoining on the west to Giles County, of which Parisburg is the county town. Making its way into Giles County it spread along the whole course of Sinking Creek, which enters New River a few miles above Parisburg. In the autumn of 1845 it began in that town; yet apparently from a different source. An emigrant from North Carolina arrived with the fever, of which he died. Soon afterwards, a number of cases occurred, but they were not traced up to communication with him. It did not become epidemic till winter, when it spread into the adjoining country in all directions. Four deaths occurred in the village. The victims were all adults. It was milder in children than grown persons. It ceased on the access of hot weather, and did not return the ensuing au the people of the village, but reappeared among those of the cou following facts have a bearing on the question of contagious propa

* See vol. i. p. 262, No. V.

ring. In the summer, one of his negro women visited a family near
ge, which had lately suffered from the fever. A few days after-
e was seized with the fever, which at the beginning manifested many
ymptoms, but became typhous and protracted. While laboring under
as removed to his father's, six miles in the country. A week after
al a negro woman who had slept in the same cabin with her was
wn and died, the other recovering. The husband of the first occu-
same room, and was next attacked, but recovered. Next, in another
nt of the same cabin, two negroes fell sick, of whom one got well,
r did not. About sixty feet from this cabin, there was another
use, in which eight cases occurred. Several of the patients were
, who did not become very sick. Lastly, his father, who resided
, was seized with the same fever and fell a victim to it. During his
nany of the neighbors visited him, without contracting the disease,
room was large and well ventilated, and their visits were generally

rench gave me the following fact. A young white woman went as
to the house at which Dr. Peck's servant seemed to have contracted
r. She sickened with it and was taken home. Dr. French had her
n a clean and well-aired room, and none of those around her expe-
an attack. Further, some members of the family visited the house
h she had worked, and were seized with the fever, which extended
iduals who had not been there, until the whole of the family, five in
, were taken down.
he forming stage of this fever was protracted, in some cases to two
weeks. The whole duration of the fever was sometimes twelve
The local affections as indicated by the symptoms were, in different
eated in the head, bowels, and lungs, the last occurred generally in

sought for. No *post-mortem* examinations were permitted. Many of those who recovered were afterwards troubled with obstinate constipation.

III. Both my informants found bloodletting powerless as to an arrest of the fever, while by exhausting the patient it did harm. When bilious symptoms were present emetics afforded relief but did not shorten the fever. Active purging was injurious, by increasing the tendency to diarrhœa. Dr. French preferred rhubarb and carbonate of soda to any other specific. Dr. Peck directed copious injections of warm water, with advantage. Calomel in repeated doses failed to produce its characteristic effects on the system, and appeared to be injurious. Sulphate of quinine did no good. Epigastric cupping, followed with emollient poultices, proved of service. On the whole the disease could not be shortened; and the practice had for its object to alleviate particular symptoms, and support the patient's strength.

IV. Extension to Blacksburg.—The sub-epidemic which has been described extended to Blacksburg, a town sixteen miles east of Parisburg, from which it is separated by two mountain ranges. Dr. Jackson informed me that in its latter stages hemorrhages from the bowels were frequent and did not portend a fatal issue. He employed small doses of calomel and ipecac. with advantage; and poultices rendered irritating with powdered mustard, applied over the abdomen proved beneficial.

V. Extension to Christiansburg.—This old town is situated at the source of one of the tributaries of New River, on a limestone plateau. It lies thirty-two miles east from Parisburg. The epidemic described under that head, rose in and around this town before it did in that. Dr. Edie saw it manifest a tendency to run through families. On one plantation, thirty negroes suffered attacks, and eight died. On another plantation, twenty negroes, all of the same blood, were seized with it, except two, who had experienced a previous attack. He never saw but one second attack. On the whole, the negroes were more affected than the whites; and, of the latter, the poor suffered more than those in comfortable circumstances. He frequently saw it limited to a single member of a family.

Dr. Edie saw many cases in which hemorrhage from the bowels occurred, and regarded it as a good, rather than a bad sign. Tympanitis was rare. Coma and subsultus tendinum sometimes occurred in the early stages of the fever, and suggested inflammation of the brain, but the progress of the disease and the effects of medicines, convinced him at length that the organ was only in a state of irritation. In winter, the lungs were deeply inflamed, or deeply engorged. In terminating, whether in health or death, it frequently seemed to observe hebdomadal periods of seven, fourteen, or twenty days. In some cases it continued for nine weeks, exhibiting symptoms of pulmonary or enteric inflammation.

In the treatment, he found simple measures best. Venesection appeared to prolong the fever. Some of those whom he bled afterwards had hemorrhage from the bowels. Vomits of ipecacuanha were useful. Purging was

injurious, except when brought about with minute doses of calomel and opium., followed by small doses of castor oil. The skin was generally moist, and sudorifics did little good. Tepid sponging was found useful. Sulphate of quinine seemed to increase the heat of the system, without relieving any symptom, or shortening the fever. To relieve the pulmonary inflammation, which often showed itself first in the latter stages of the fever, he gave opium and blue mercurial mass, cupped, blistered, and made his patients inhale aqueous vapor. Of the last he thought highly.

It is proper to add, that although the mountain ranges surrounding the plains and valleys which have been described are composed of sandstone, the latter rest on limestone.

SECTION IV.

SUB-EPIDEMICS IN BUNCOMBE COUNTY, NORTH CAROLINA.

I. MEDICAL TOPOGRAPHY.—Not having visited this region before writing the topography of the first volume, I must briefly describe it here. Buncombe County, and the basin of the French Broad, one of the elementary streams of the Tennessee River, were once synonymous, but the civil limits of the former have been reduced; yet the well-known name may stand with the medical historian as designating a region,—that portion of North Carolina which lies west of the Blue Ridge, which is here the watershed between the Interior Valley and the Atlantic plain. It lies between the 35th and 36th parallels.

This region is in the centre of the great southern tuberosity of the Appalachian Range, which constitutes a remarkable hydrographical centre.* Several summits range between five and six thousand feet above the level of the sea, while Point Mitchell, the highest peak of the Black Mountain, rises to 6476. Several tributaries of the French Broad originate on the slopes of this mountain, and flow off westwardly through cultivated valleys, to enter that river by its right bank. Its general course is from south to north. In the centre of the mountain region, there is a valley extension, from 15 to 20 miles in breadth, and nearly twice as much in length, through which, near its western margin, the river flows. This valley, with the smaller ones opening into it, are the chief seats of population. Its elevation above the sea varies from 22 to 2500 feet; but a portion of the people reside at a higher altitude. Buncombe County reduced, and Henderson County set off from it on the south, divide this valley between them. Ashville, the county seat of the former, is the ancient metropolis of this Alpine region. Hendersonville, a young village, is the beautifully-situated county seat of the latter. Flat Rock is a settlement a few miles south of Hendersonville. Its people are almost entirely rich citizens and planters of South Carolina

* See vol. i. p. 16, E.

and Georgia, who here find a summer residence which the fevers of the low country never reach, although they live contiguous to small streams, with broad, marshy, and paludal bottoms, as are many of those along the French Broad.

The Buncombe region lies entirely within the great primitive formation of the South, and all its rocks are granite, gneiss, or mica slate. Its springs of course afford soft water, the temperature of which I found in the month of May, to vary in different places from 53° to 55° Fah.

I cannot conclude this hasty and most imperfect sketch, without indicating to the people of Middle Tennessee, Alabama, and Florida, the signal advantages of a summer residence in this region, whether we refer to exemption from malarial fevers, to the renovation of broken-down constitutions, or to the enjoyment which comes from the daily sight and contemplation of grand and beautiful mountain scenery.

II. Along the French Broad and its tributaries, intermittent fever is nearly unknown. Remittents, generally becoming continued, occasionally occur, but not oftener near the water-courses than at a distance from them. Those cases which constitute, so to speak, a connecting link between the periodical and the typhous fevers, have been briefly described in the first section of this chapter. They are the true mountain fever, sporadic at almost any season of the year, and sometimes prevailing to a semi-epidemic degree in autumn and early winter.

Of this form of fever, Dr. Whitted and Dr. Jones of Hendersonville had seen very few cases in several years, although the often-inundated and swampy valley of Muddy Creek, a branch of the French Broad, is within their range of practice. Such a valley at a lower level, with springs of the temperature of 54° Fah., would afford much autumnal fever. Why should it not be the same here? At Hendersonville, the gentlemen just named had seen no original case of typhous fever; the experience of Drs. Lester and Ashville had been nearly the same.

III. History.—The long residence and extended practice of Dr. J. F. E. Hardy, of Ashville, has presented him with facts which throw more light on the fevers of this elevated region. Through a period of twenty-six years, this observing and indefatigable physician has annually seen a remitto-typhous fever, which was more rife from August to November, inclusive, than at other times. It prevailed more in the country than the village of Ashville; and was more frequent in the early than the latter years of his practice. The people among whom it prevailed most, lived chiefly in crowded and unventilated cabins, without windows. Those on the banks of the French Broad, and its tributaries, were not more liable to it than the inhabitants of the highest and driest localities. Sometimes it assumes a subepidemic character, as appears from the following observations.

A. D. 1829.—In the autumn of this year, beginning in August and ending in November, Dr. Hardy had fifty-two cases, in eight or ten families of

ighborhood, west of the French Broad and distributed along its tribu-
ooks. They were all poor whites, living in low, close log cabins,
lly without windows, and always with floors nearly in contact with
und. A majority of each family were taken down—and in some in-
, the whole. It attacked these families *seriatim;* yet there was no
introduction of it into the first, nor any discoverable contagious
nication. In one family, consisting of twelve persons, the fever
d every member, except a daughter, twelve years old; if, indeed, she
exception, seeing that she experienced a severe illness at the same

r a day of chilliness and headache, a kind of nettle-rash broke out,
hich there was an oozing of blood, and the wheals or whelks soon
d a dark or livid color. A slight hemorrhage from the nose super-
and another from the bowels, so copious as to produce exhaustion.
irium, coma, or subsultus tendinum occurred, however, and she re-
l in eight or ten days, under the use of calomel, opium, and sugar of
ith burnt brandy toddy internally, and a bath of oak-bark decotion.
er member of this family had hemorrhage.

le the fever was prevailing in this neighborhood, dysentery was rife
ther, twelve miles further up the French Broad, and some of the
sumed a typhous character.

D. 1838.—In this year Dr. Hardy saw a poor white family of sixteen
s, who lodged in two dirty rooms, attacked with the same form of fever.
d it but the old man. As many as eight were down at one time.
of them had hemorrhage from the nose, bowels, and tongue. Blood
be pressed out of the least as from a sponge. The whole recovered.
ver did not prevail in the neighborhood, nor was it communicated
his family.

D. 1842.—Through the autumn of this year, beginning in the latter
f August, twenty-one negroes on the plantation of Mr. P. experienced
s of the fever. They had been well fed with bread and meat; but
odged in crowded huts without windows, and with floors close to the
l. All recovered except one, a pregnant woman, who suffered abor-
efore death. No other family in the neighborhood had the fever; but
recollected that several years before, the negroes occupying the same
had experienced a similar attack.

D. 1849.—In the month of August, a white family, in the beautiful
of the Swananoa, four miles from Ashville, charitably received a
raveller from East Tennessee, whose disease proved to be continued
hous fever. He recovered. There were but two rooms in the house,
ome members of the family slept in the one where he lay. They con-
l of the husband, wife, and four children, every one of whom sickened
the fever, and the parents died. No family in the vicinity took it.
e were no marshes or wet alluvions where this family resided.

Dr. Hardy has never seen a general typhous atmospheric constitution. The fever has always prevailed, here and there, in neighborhoods, some of which have been high up the mountains, between 2500 and 3000 feet. He has slept night after night in the same rooms with his distant patients, but never contracted the disease.

IV. Symptoms.—Forming stage slow and deceptious. Anorexia, foul tongue, chilliness, dull headache, feeble and frequent pulse, and constipation, to which the patient generally ascribes all his bad feelings. This condition may continue for two days or a week; when fever with a peculiar anxiety of countenance, parched skin, acute headache, sleeplessness and jactitation, supervenes; the epigastrium becomes tender, and the stools are either of a pea green, or clay color. The morning sub-remission is without moisture of the skin, and the exacerbation unpreceded by a chill; though sometimes a creeping sensation occurs. The heavy coat of fur on the tongue soon becomes brown and dry, the organ itself assuming a pointed form with red edges. Delirium, wild or low, is generally present, and often commences early; coma seldom occurs till the tenth or twelfth day; subsultus tendinum is less often present, but not so frequent as the other two symptoms. The pupil in the early periods of the hot stage is often contracted. In some fatal cases the eye is red, and its expression wild without delirium. Sordes of the teeth and lips are common. Petechiæ occasionally appear in the latter stages. Abdominal tenderness is common: tympanitis rarer. Diarrhœa frequently occurs and coagula of blood are occasionally discharged. In some cases carbunculoid abscesses occur in the cellular tissue of the trunk and extremities, which discharge dark sloughs resembling coagula; they are not painful, but presage a slow recovery. Dr. Hardy had not been permitted to make any *post-mortem* examinations.

V. Treatment.—Dr. Hardy has never bled in this fever, and rarely cupped. He has not vomited and but seldom purged. His reliance has been on a combination of calomel, ipecac. and opium, with cold affusions or spongings. A salivation has seldom occurred. To check the diarrhœa he has added sugar of lead to the other remedies. He has given James's powder and other sudorifics a full trial, but was disappointed. He has oftener seen a perspiration follow the cold bath. Subacid drinks have been useful. He thinks blisters of less value than sinapisms. He has covered the abdomen with a mush poultice sprinkled with powdered mustard, and it greatly mitigated the abdominal symptoms. He has used but little sulphate of quinine; and when a tonic was required gave a cold infusion of wild cherry bark, *Prunus Virginiana*.

The study of its fevers is on that account the more interesting.
r counties are Sullivan, Carter, and Washington. Its most important
iesboro. I have not been able to visit this district, and shall avail
f the published observations of Dr. Cunningham, a very competent
), of Jonesboro.

ISTORY.—In a report on the fevers of East Tennessee that gentleman
general way, indicated the prevalence of typhous fevers in this
They prevail on dry ridges, while remittents and intermittents
ng the streams, with now and then a case in both localities at
iodical and typhous. They prevail through all the seasons, and
ar in what are apparently the most healthy localities. The follow-
nary of symptoms is extracted from his paper.†

upwards of twenty years, we have had frequent opportunities of
with it, and observing its phases. Patients generally complain
or sometimes for weeks, before the attack, of loss of appetite, head-
lessness and dulness. Sometimes these symptoms steal on gradu-
il the patient goes to bed without any marked chill or fever, or
crease of pulse, or other symptoms which attend the stadium pro-
m of the other fevers. There is merely an increased indisposition
y developed, some excitement of pulse, the secretions failing almost
ed, so that it is difficult to fix any precise period of accession. The
and other functions seem to fail *pari passu* with the gradual incre-
fever. When these premonitory symptoms are early attended to,
er is pretty easily averted. A purge or two of calomel and oil,
it diet and rest; or a few powders, daily, of ipecac. and calomel,
he functions. But when neglected until fever is fully developed
e is often serious. During the progress there is accelerated pulse
to day, with very little diurnal remission; towards morning there
lly an alleviation, but not a marked remission of symptoms. The

Then follow colliquative stools, incoherence of thought, and without a change, the patient is lost."

* * * * * * * *

"Abdominal tenderness on pressure, rarely present at the beginning, is a pretty constant symptom after it has advanced but a few days; and it is one of the most difficult to meet of all the attendant symptoms."

III. TREATMENT.—In the forming stage of this disease Dr. C. has seen one or two doses of calomel and oil, with light diet and rest, or a few powders daily of ipecac. and calomel, restore the functions. In the course of the fever he lays great stress on cupping over the spine, and the subsequent applications of rubefacients to that part and also to the feet and legs. He found active purges injurious—the pulse becoming more frequent and the abdominal tenderness greater, under their use. He administered demulcent drinks freely, and often combined opium with ipecac. and calomel, with good effect. Blisters also proved serviceable. A mild mercurial action was auspicious. Sulphate of quinine was tried, but except in remitting cases did no good—perhaps harm. On the whole he concluded that in general nothing could be effected but to correct particular symptoms, and await the spontaneous issue of the disease.

In the winter season many cases were complicated with inflammation of the lungs, when early bloodletting was indispensable.

CHAPTER III.

LOCAL HISTORIES OF TYPHOUS FEVERS IN THE SOUTHERN BASIN, CONTINUED; IN PENNSYLVANIA, OHIO, INDIANA, AND ILLINOIS.

SECTION I.

IN AND AROUND UNIONTOWN, PENNSYLVANIA.*

I. AN epidemic began in the summer of 1846 and continued through the winter and following spring, not having entirely ceased when I visited the place in July, 1847. According to Dr. Fuller and Dr. Walker, my principal informants, this fever prevailed in a high valley east of Laurel Mountain, before it appeared in Uniontown, which stands at the western base of that mountain. The first two cases of which they knew anything were in a poor family, seven miles out of town. Ten or twelve families lived near, in a kind of hamlet, and every family which had intercourse with those two patients suffered from the fever. Two brothers came from the country to see a sister sick with the fever in Uniontown, and both were attacked after returning home. Dr.

* See vol. i. p. 268.

Diarrhœa was an early symptom, and the discharges often thin and
h, were followed by a tendency to syncope. Not one patient was
The worst cases were attended with irritability of the stomach and
g. Abdominal pain, especially in the right iliac region, was com-
The tongue in the beginning was covered with a yellowish fur, which
ed, changed to brown, and the organ contracted laterally, with a red
rdes on the teeth were common. Stupor, delirium, and subsultus,
patients, were of early occurrence. The eyes put on a yellowish,
ot appearance. A flea-bite efflorescence appeared in a large propor-
ases; in a few on the arms and legs, but generally limited to the
of the trunk of the body. They commonly appeared on the third
h day after the reaction commenced, and disappeared before the
he disease. In some protracted cases, accompanied by perspiration,
a occurred. One-fourth of all his patients had intestinal hemor-
hich in the early stages seemed beneficial, but in the latter injurious
tentous; indeed all his fatal cases were attended with hemorrhages
latter stages. A boy fourteen years old, who had experienced an
f purpura hemorrhagica four years previously, had bleeding from
, mouth, and kidneys. Coldness of the knees while the feet kept
ortended a fatal termination. In the course of several bad cases,
tis supervened.

Dr. Fuller made a *post-mortem* inspection of those who died in the
se. In the stomach of one he found ulceration; in another the
y ravages of gastritis; in the remainder no signs of inflammation.
e met with diffused inflammatory redness of the mucous membrane
the ileum and colon, interspersed with ulcers, affecting chiefly the
l patches: portions of the ileum were, in some, greatly contracted.
as no perforation of the bowel. The spleen was generally sound, but
ubject enlarged, and almost as pulpy and tender as a coagulum of

patients repeated several times and seemed to do much good. He saw a blister to the abdomen arrest the diarrhœa. Warm and even hot fomentations to the same part relieved the pain and tenderness and often brought on perspiration. In several instances, the people seemed to "break the fever" in its early stages by surrounding the patient with ears of Indian corn boiled and applied hot, sweating teas being at the same time administered freely. Vomits were not used, and but little calomel. Active purging was injurious. The hydrargyrum cum cretâ was found useful, especially when combined with the ipecac. and sulphate of morphia. After the diarrhœa was arrested, he sometimes gave teaspoonful doses of castor *oil*. The most manageable cases were those of greatest arterial reaction, with but little gastric irritability. A copious bloodletting followed by Dover's powders, frequently arrested them. In the advanced stage of the several cases the sphincter ani seemed paralysed, for the patients would have involuntary evacuations, of which they were fully conscious. He administered brandy and carbonate of ammonia in a few cases, but the results were bad. In protracted cases, beef tea was found useful. Dr. Walker's practice was substantially the same as Dr. Fuller's.

V. At the same time that this fever was epidemic at Uniontown, it prevailed at Brownsville, twelve miles from the mountains.* Prevailing more or less in the summer, it reached its epidemic acme about the middle of winter. Dr. Lafferty met with no facts showing a contagious character, and saw many patients who had not been near those laboring under the disease. It prevailed chiefly in town, and the country cases were mildest. Diarrhœa was present in every case, and often constituted the first symptom. It sometimes continued for two weeks before the patient took to his bed. In some cases the appetite was unimpaired throughout the whole course of the disease. In several he observed rose-colored maculæ on the trunk of the body. It is unnecessary to recount all the symptoms, as they were nearly the same with those already described. About one-tenth of those who were so ill as to lie in bed, died. Dr. Lafferty's treatment was nearly the same as that which has been given, but he did not bleed. Two-grain doses of acetate of lead, and twenty-drop doses of oil of turpentine, were found useful in the diarrhœa. He tried sulphate of quinine, and found it injurious.

Of the different epidemics which have been described this manifestly approaches nearest to the "typhoid affection" of Louis.

SECTION II.

IN WASHINGTON AND THE SURROUNDING COUNTRY.†

I. Dr. Lemoine assured me that for fifteen years before 1847, the fevers of this region had been assuming more and more of a continued and typhous

* See vol. i. p. 268-9, No. VIII. † Ibid.

the town of Washington, during the winter of 1840–7, about thirty
irred. In one dirty and crowded house there were, according to
art and Dr. King, six cases, three of which proved fatal. In
ouse, better kept, out of six college students, four had the fever.
tion of the attack was generally about three weeks. There was no
of contagious propagation. One patient was bled and recovered.
l was not buffy. An emetic in the beginning put an end to the
l chilliness. Subsequently the saline mixture (solution of acetate
with a minute addition of tartarized antimony) was found useful.
e cupping, followed by cataplasms of Indian corn meal and pow-
stard, was found serviceable.

rom Dr. Reed, I obtained the following facts: Taylorstown, in a
t far from Washington, had a population of about 120 souls. In
: of its inhabitants, on his way home from some place in the moun-
s attacked with continued fever, of which he died in a week after
home. His father and two sisters sickened with the same fever.
who came to nurse them experienced the same fate, as did two of
ren. A woman who visited the first family experienced an attack,
ressing through the winter, eight out of nine children were taken
ut of the 120 inhabitants of the village, fifty suffered from the
nd eight died. When I was at Washington eight years after this
, no other had been experienced. Dr. Davidson has informed me,
ttended many of the patients in this little epidemic, which seemed
from the family in which it first appeared. Diarrhœa was replaced
iveness, so that aperients were necessary. The stomach was gene-
quil. A few patients had hemorrhage from the bowels. The dry
ppearance of the tongue, and the delirium, stupor, and subsultus of
stages, marked it as a typhus fever. He bled most of his patients
ne of them two and three times. The blood was often sizy. He

delirium, and subsultus tendinum, being among its phenomena. Diarrhœa chiefly occurred as a consequence of purging. In its treatment Dr. G. was cautious about the exhibition of cathartics; and used opiates and demulcents. Externally he resorted to cupping, blisters, and sinapisms. This gentle treatment was uniformly successful. Dr. G. understood that venesection and liberal doses of calomel were employed without success.

SECTION III.

IN AND AROUND PITTSBURG.*

I. In 1847, Dr. Gazzam, long resident in this city, assured me that typhus fevers, for several years past, had occurred more frequently than formerly, yet the place had not been seriously visited. Only now and then had the fever approached to an epidemic character. According to Dr. Bruce an invasion of this kind occurred in 1846. Diarrhœa was generally present, often at the beginning, but sometimes not till after the second week. Tenderness with meteorism and gurgling in the right iliac region was common. Intestinal hemorrhage was common. In one case after continuing for twenty-four hours, it seemed to be arrested by oil of turpentine. Nearly every patient was delirious. It attacked males and females equally, generally seizing those in the first half of adult life. The earliest convalescence which he witnessed was on the 18th day. It often ran through five weeks. Bloodletting was not beneficial. No prescriptions had the effect of shortening the fever.

II. For three years Dr. Hamilton witnessed a considerable prevalence of the same kind of fever in the city of Allegheny adjoining Pittsburg. Children under ten years of age were exempt. The bowels were so irritable that only the mildest aperients could be borne. Congestions of the brain and lungs were common. Local bleeding was beneficial. In some cases he found the sulphate of quinine useful. Dr. Smith of the same city saw cases of the fever which continued for three months. Many patients kept in bed for six weeks. It often attacked vigorous and hard-working young men. In some cases the mouth became aphthous. He bled in a few cases only, but cupped with advantage. The diarrhœa was often checked by small doses of turpentine. The fever could be moderated by powders of nitrate of potash, calomel, and ipecac. Small doses of sulphate of quinine were sometimes useful. Opium generally increased the cerebral symptoms, and both he and Dr. Hamilton found the extract of hyoscyamus preferable.

III. At Butler.† Dr. De Wolfe had resided in this town thirty years when I passed through it in 1847. For the first seven years the febrile diseases were decidedly inflammatory, showing no typhous tendency. In the year 1823, a man returned from the Ohio River, with a fever of the latter kind. In the course of a year Dr. De Wolfe had more than 100 cases of

* See vol. i. p. 271, No. I. † See vol. i. p. 276, No. II.

he same character, all of which, according to his observations, could be raced directly or indirectly to this case. The duration of the fever in different cases continued from four to ten weeks. It spread but little into he surrounding country. For eight or ten years after the onset of this ocal semi-epidemic, the diseases of that place manifested more or less of a typhous character.

SECTION IV.

IN TRUMBULL,* AND THE ADJOINING COUNTIES.

I. ACCORDING to Prof. Kirtland, the epidemic typhous constitution of 1813, described in Section II., continued with more or less intensity, in certain parts of this county, for the ensuing twelve or fourteen years. Early in the summer of 1827, "a low malignant typhus," began to manifest itself. The succeeding winter is reported by Dr. Allen† to have been unusually warm and wet. In the following summer it returned with greater violence, beginning with July and terminating with November; during which, although it was at first confined to a large family connection, it overspread a parallelogram of ten by twenty miles. In the summer of 1829 it appeared in a distinct neighborhood, again prevailing first in a single family, and spread over a tract of country almost as great as before, after which it disappeared.

II. The following is Prof. Kirtland's summary of the symptoms of this epidemic, which he denominates typhus syncopalis:—

"Persons of all ages and both sexes are equally liable to its attacks. The prominent symptoms are, pains in the head, back, and limbs, oppression about the eyes and forehead, cold extremities for some days before the true character of the complaint is fully developed, unequal excitement, nausea, and vomiting, torpor or irritability of the stomach and system generally, the appearance of the tongue varying at different times in the same patient, and affording little information as to the state of disease, the face livid and strongly marked with the Hippocratic features, even from the first moment of the attack, the skin either moist, cold and clammy, shrivelled and dry, or painfully hot to the touch, from the calor mordax or stinging heat, when perhaps the actual temperature of the sick is below that of ourselves; sanious hemorrhages, petechia, subsidensia, coma, and delirium.

"The several varieties of this fever are formed by different combinations of a greater or less number of these symptoms, yet no one of them can be considered as common to every case, unless it be the gastric sinking; a tendency to which is not often absent. It is a deathlike sensation referred to the epigastric region, and occurs in paroxysms, attended with cold extremities, vertigo, feeble pulse, palpitation of the heart, difficult breathing,

*For some general notices of the medical topography of the region which includes these counties, see vol. i. p. 282–6.

†MS. letter.

spasms, and a livid, distressed countenance, and is liable to occur daily, at regular periods, or may be produced by raising the patient from a horizontal posture. The light attacks are often mistaken by nurses and bystanders for faintings."*

From Dr. Allen's letter, I collect that the pulse in some cases showed increased energy, but was generally frequent, small, and soft. The bowels were easily moved, though sometimes costive. In the latter stage of the fever, many had alvine discharges of blood. No *post-mortem* examination seems to have been made.

III. METHODS OF TREATMENT.—Professor Kirtland refers the treatment in the epidemic to two heads, *counteraction* and *support*, observing that in some cases it was necessary to transpose their order, and sustain the sinking energies of the system before employing counter-irritants; adding as a general remark, that whatever tended to reduce or exhaust the patient, was to be avoided. Bloodletting, purging with neutral salts, and emetics, especially of tartarized antimony, were found injurious. Calomel and magnesia, to produce moderate alvine evacuation, he found serviceable. Nauseating nitre, saline effervescing draughts, vegetable acids, sweet spirit of nitre, and cold drinks, he found either inert, or positively injurious. His internal corroborants were brandy, wine, capsicum, tincture of cantharides, carbonate of ammonia, camphor, serpentaria, cinchona, quassia, but above all opium, to which he added arsenic, when a case displayed something of an intermittent character. He also administered soup, coffee, and other nutriments. Externally, he applied the warm bath, quenched fire-brands, blocks of wood steeped in boiling water, and large blisters renewed daily, to the limbs, head, and nucha; sinapisms, and bandages dipped in hot oil of turpentine. His method, in short, was that of active and unabating stimulation—internal and external. Professor K. does not tell us what proportion of the sick recovered under his treatment.

The method pursued by Dr. Allen was substantially the same. After enumerating its items in detail, he observes: "The doctrine we were taught in our youth, that the debility in fevers is indirect or consequent on previous excitement, did not hold good in this epidemic."

"I recollect," continues he, "more than once of entering the room of a distant patient bathed in cold perspiration under the use of nitre, Dover's powder, &c., who was immediately relieved and restored by brandy and quinine." "In 1829," he adds, "the epidemic commenced about twenty miles from my residence, and the first patients, together with the physician who attended them, died. On visiting the neighborhood, I advised another physician, Dr. Palmer, to pursue the course I have recommended, which he did, and of between twenty or thirty cases all recovered except one, who was lost by relapsing."

COLUMBIANA COUNTY.—I am indebted to Dr. George M'Cook, of New Lisbon, in this county, for the following brief notice. In the winter of 1822-3,

* Medical Recorder, vol. xiv. p. 441. (ED.)

yphus fever broke out four miles from town, in a family which had ly emigrated from New England, where a fever, which they declared to of the same kind, prevailed. Three out of four of the family died of it. fever soon extended over the country; but no facts are given to show it spread from this family. It affected the people living on elevated es, more than others. The duration of the epidemic constitution was ut four years, after which up to 1846, it had not returned, except spo- lically. The cases in which the onset of the fever was not sudden and lent, proved most amenable to treatment. In the worst cases, the heat the surface was defective. An intolerable pain in the front part of the ad was a common symptom. Deafness occurred in three cases, all of which ved fatal. In some, the hearing was morbidly acute. Delirium, coma, d subsultus tendinum were common. Several patients had hemorrhage m the nose, a greater number from the bowels, and both were bad symp- ms. Of the state of the bowels, Dr. M'C. does not speak, but mentions dominal tenderness. For the cure of this fever, he first administered rtar emetic and calomel, so as to vomit and purge. In many cases he re- ated the emetic. Afterwards he sought to re-excite the functions of the in with stimulating diaphoretics, such as an infusion of aristolochia serpen- ria, with camphor, opium, and carbonate of ammonia. To a patient lected with extreme jactitation and subsultus tendinum, so that death emed to be at hand, he gave "incredible doses" of opium and camphor, d applied sinapisms to the wrists and ankles, under which, recovery took ace.

This epidemic constitution continued about four years, and when Dr. M'C. rote in 1846, it had never returned; but occasional cases of a typhous haracter were seen.

SECTION V.

IN BELMONT AND THE ADJOINING COUNTIES.*

I. History.—Dr. Thomas Carroll, now of Cincinnati, but formerly of t. Clairsville, in Belmont County, has published an account of a typhus ver which occurred in his practice.† He first met with it in 1826, but it ight have prevailed before, as he was not there. For the next sixteen ars he often met with it; sometimes in one part of the country, at other mes in other parts, and also in the adjoining counties of Harrison and Jeffer- n. In the year just mentioned, it commenced late in autumn, and he saw re than fifty cases of it. In other years, and oftener than otherwise, it began the winter. It generally commenced with a single individual of a family the country, in a week or two after which another would be seized, and n another. Meanwhile some one or more of the neighbors who visited

* See vol. i. p. 282–6. † Western Journal (Louisville), vol. v. p. 31.

the family would be taken down, and then some member of a third family, who had visited the sick in the second. Thus, it *seemed* to spread by contagion. In that county there are many families of the Society of Friends (Quakers), noted for their temperate habits, domestic cleanliness and comfort, not less than their humane and diligent attendance on the sick; among whom he observed the fever to be peculiarly prevalent. Children as well as adults were obnoxious to it; and no mode of living seemed either to invite or repel its attacks.

II. SYMPTOMS.—I shall borrow Dr. Carroll's condensed account of the symptoms which characterized this fever:—

"When an individual is about being taken with this fever he appears languid, has a bad appetite, and complains sometimes of a headache, and again of pain in the back; inclines to sleep, though his slumbers are disturbed, and he rises from them without feeling refreshed. After some days spent in this way, he gets out of bed but seldom, eats little or none, and his mind sometimes wanders when he is aroused. In a day or two more he lies all the time, unless his brain be seriously affected, when he is often much inclined to sit up, even when very ill. If his skin be examined during this time it will be found dry and inactive, and when pinched into folds it regains its smoothness very slowly, showing the loss of its elasticity. There is commonly but little flushing of the face at the commencement of the disease, but, as the fever advances, this symptom becomes more developed, especially in the after part of the day, and in some cases is eventually relieved by sweating. If the brain be diseased early, he will often show slight delirium, and will mostly complain of disagreeable feelings when he shakes his head, which he will not do without being urged; the eyes frequently become more brilliant than usual, and there is sometimes morbid acuteness of vision, with suffusion of the conjunctiva. Headache is not always present when the brain or its membranes are affected, and it is often present when the result shows that these parts were very little, if at all, inflamed. When the patient gets down it will be found that the fever is regularly augmented in the afternoon, and during the fore part of the night, when it begins to become more mild and abates considerably against morning; but is again renewed with the same result as before. It, however, is commonly more severe every other day throughout the course. During the continuance of the fever, the surface is *generally* somewhat above the natural temperature, though it is often not warmer than in health, and frequently as cool or even cooler. Sometimes this fever appears in an acute form, running its course in a few days. In these cases, the brain or heart is most deeply affected, sometimes one of these organs being more diseased and sometimes the other. When the heart is affected, the pulse has an irregular beat, and seems corded, and occasionally intermits; but when the brain is affected there are delirium, pain in the head, with subsultus, intolerance of light, &c. The acute form is sometimes occasionally ushered in with chills. This symptom

, however, seldom observed at the commencement of the subacute. A dry ngue is very common at all periods, but especially in the latter, when it is ften brown in the centre, with a flabby inactive appearance. When the atient attempts to put it out, it seems to catch on the teeth. It is some- imes pointed. The former of these symptoms is unfavorable, the latter ore so.

"It is, probably, unnecessary to say anything now about the symptoms hich mark a favorable termination of the fever. I will, however, make few remarks on those that are unfavorable. Great irritability of the tomach with pain in it and the bowels, and tenderness of the epigastrium nd abdomen generally, are unfavorable; hemorrhage from the bowels is mong the most unfavorable symptoms; and still more so is a swelling of he penis; indeed I have but seldom seen a recovery from fever when this ymptom supervenes. The want of the tonic contraction of the cremaster uscles is also unfavorable; when this is the case, the testes are found low the scrotum, which is also relaxed. I am inclined to think that when hese two last symptoms are present, the brain is incurably affected. It ight be improper for me to pass over another symptom that I have often itnessed. When you lift one of the forearms, so that it forms with the rm a right angle, and hold it there a few moments, and then take your and away, if it be retained by the patient in this position, voluntarily, ntil it begins to tremble, and then falls without a voluntary act of the atient, it may be considered that danger is present and the chances of ecovery are few."

III. TREATMENT.—The duration of the fever varied from one to seven eeks, or even more. After it was established, no course of treatment eemed to shorten it; and any great reduction of the vital forces for the urpose of producing that result did harm. According to Dr. Carroll:

"The first step to be taken in the acute form of this fever, is to bleed ntil the patient either approaches to syncope or does faint; to effect this ithout danger, he should be in a sitting or erect position when bled. As oon as he partially recovers from the effects of the loss of blood, he should e placed in a sitting position, when two or three gallons of cold water ught to be dashed over him; if his head be much affected it should be llowed to fall in a heavy stream on it, for by this means it will be much elieved. It then becomes necessary to administer either a cathartic or an metic. If the patient have a foul tongue and his head be not much affected, he latter should be preferred; but if these circumstances do not exist, the rmer should be chosen. Should the physician determine in favor of an metic he will consult the interests of his patient by giving him, in some arm water, half a grain of tartar emetic, and one or two grains of ipeca- anha combined, every half hour, until vomiting is effected. It is now portant that a powerful cathartic should be given, composed in most es, of calomel and jalap, or for the jalap, castor oil, or senna and salts,

or, in weak constitutions, rhubarb. After a free cathartic effect has been obtained, tartar emetic should be given in such doses as will not sicken, and be persevered in throughout the disease, unless it should be found that it does not agree with the patient. But few cases will be met with, however, where a twelfth of a grain cannot be borne, and this amount will be sufficient to begin with, and should it be borne with ease, the dose can be increased as occasion may require. It should be given every four or six hours. After a free cathartic influence has been obtained, twenty grains of calomel should also be given and repeated every six or eight hours, until the mouth becomes sore, or the specific effect is produced on the general system; for many cases will be met with where the mouth cannot be made sore, yet the constitutional influence of the mercury will be obtained. When the calomel has been given until it has produced its specific effect, no more should afterwards be exhibited than enough to keep the secretions of the alimentary canal right. Two or three grains a day will be found sufficient for this purpose, and if profuse salivation should occur, no more should be given for at least a week. It has been a favorite opinion with many, that when salivation is once produced, the fever of course ceases. This opinion is, however, fallacious, for nothing is more common than to see the fever go on for weeks after the specific influence of mercury has been induced. It is true that it is generally mitigated by the mercurial action, but by no means always destroyed.

"When the disease commences in a slow manner, the patient not even complaining of chilliness, it may be called subacute, and must be treated more mildly. If there be no tenderness of the epigastrium, and if the brain be not affected, the treatment may be commenced with an emetic, after which a dose of calomel and jalap, or rhubarb, should be administered, and repeated every few hours until it operates. So soon as the bowels are cleared, antimonials should be given, and continued as directed above. Five grains of calomel, or more, should be given every four or six hours, until the mouth is made slightly sore, or the general system is affected, which will be known by an increased fulness and regularity of the pulse. When this is brought about, all has been done that can be advantageously accomplished by mercury in large doses. As in acute cases, the action of the liver and the secretions and excretions of the abdominal viscera generally, should be kept in a proper state of activity. This can be best done by calomel or the blue pill. I am much in favor of the latter in female patients, and in all delicate or enfeebled constitutions. One or two alvine evacuations should be procured daily through the fore or middle part of the fever; but if it continue for a long time, as for more than two weeks, I would only wish one evacuation a day, or one every other, or every third day, if the patient should be very low. Rhubarb, combined with compound extract of colocynth, and a small proportion of ipecacuanha, will form a very good combi-

nation for the purpose; the physician will, however, find jalap, salts and senna, and magnesia, to answer a good purpose.

"When there is local inflammation or congestion of the brain, or of any other part of the system, whether in the acute or subacute forms of the disease, attention must be given to it. If in the brain or its membranes, keeping the hair wet with cold or tepid water, will be of use. Cupping on the temples or back of the neck, will also be of much service. Should those not relieve, I would advise blistering on the head or neck. When there is pain in the small of the back, cupping and blistering will be of much service. If the stomach be irritable, or if there be tenderness of the epigastrium, cupping should be used, and after it, blistering. If the patient be weak, it would be better not to scarify. If there be pain or tenderness generally diffused over the abdomen, cupping should never be neglected. Half a dozen cups, either with or without scarification, will give great relief, and this may be repeated several times, if the irritability continue. Local applications may be used with advantage.

"It is a matter of moment in the treatment of this fever, that nothing shall be done to bring the pulse below the natural standard for any length of time. I would always prefer having a pulse a little above this standard. When it falls below, means should be taken to raise it. This is effected by the addition of camphor, ammonia, good wine, or brandy. Opium will often be found useful, particularly when combined with ipecacuanha, but I think five-grain doses of camphor, with a grain of ipecacuanha, if the latter be admissible, will answer a better purpose than most other stimulants. Sulphate of morphia or opium may be added, if thought proper. If these three medicines be given in combination, when there is a disposition to sweat, their effects will be most salutary. I should not neglect to observe, that sulphate of quinine, if given in moderate doses, is a medicine of great value in the treatment of this fever, when much debility is present.

"Much has been said for and against bleeding in the cure of this fever, and it has been urged that physicians who have been in the habit of bleeding for it, have often been unfortunate; this I cannot deny. Bleeding is but seldom necessary, as the warm or cold affusion will generally moderate the force of the fever more safely than bleeding; indeed, I would advise the young practitioner to resort to the lancet with much caution, for if he bleeds so that the pulse does not regain a firm beat, he will assuredly lose his patient.

"Sometimes after this fever has existed for a number of days, or even weeks, hemorrhage from the bowels takes place. This may be feared when the tongue of a sudden loses a thick coat, which comes off in flakes, and leaves the surface smooth and red, with a polished appearance, and in cases where but little emaciation has taken place, and where there is fulness of the abdomen. The most common cause of its appearance is excessive purgation, for a number of days. This is particularly the case where calomel

has been given in large quantities at the same time that cold water has been administered largely. Some practitioners never give up the administration of calomel in frightful doses until their patients are either salivated or poisoned to death. Uninterrupted purging is wrong, and giving mercury with an idea that it does no good unless the patient is salivated, is as bad. This most potent medicine is shamefully abused in this way, and I am not certain but that its indiscriminate exhibition with cold drinks, often has a most injurious tendency. When hemorrhage occurs, it becomes necessary at once to cease giving the purgative medicine, and to give opiates every six or eight hours, until the bleeding ceases. The addition of ipecacuanha to the opium will be useful, and if but little mercury has been administered, moderate quantities of calomel should be combined with the opium or morphine. Dry cupping will be important over the abdomen, after which a blister should be applied. Purging must not be attempted under four or five days, when rhubarb or castor oil should be given slowly until the operation is procured. When this is effected, great care should be taken to avoid frequent purging. Quinine is often of much use after great loss of blood in this way; wine and brandy are also useful. The first cases of this affection which I saw all terminated unfavorably; indeed, I at one time almost came to the conclusion that death was inevitable, but, eventually, being called to a case in my own practice, where the family had given large doses of salts, I concluded that I would try calomel, opium, and ipecacuanha, and I had the satisfaction of saving my patient, and have not lost one since with bleeding from the bowels. I did not suffer the patient in this case to take any cathartic medicine for more than a week. However, in about five days he had an operation from the effects of the calomel. When I first saw this patient, I thought all was over with him, as I found him in a fainting condition from the loss of blood. Since the time I attended this case, I have seen several nearly as bad, and some much worse, yet they all recovered.

"In conclusion, I may observe, that if the method which I have laid down for the treatment of this fever be pursued, but few cases will be lost. During a residence as a practitioner of medicine in this district of country, which I have described, for eighteen years, I lost but very few cases, probably not more than one in each year, and indeed I shall always look back with pleasure upon my success in the treatment of these cases."

SECTION VI.

IN GREENE COUNTY, OHIO.

I. THE surface of this county is substantially the same as that of Fayette.* Dr. Dawson† has published an account of 21 cases of typhus fever

* See vol. i. p. 294, No. II. † West. Jour. (Louisville) for Sept. 1844.

ich had lately occurred in his practice, which considering the sparseness population in and around the village of Jamestown, in which he resides, sufficient to constitute it a minor epidemic. I gather from his papers following facts:—

1. For 6 or 8 years he had observed, every winter, several cases of conued fever which he regarded as of a typhous character; but a short time fore he wrote, July 1st, 1844, 21 cases had occurred in his practice.

2. Of these cases 19 were in persons of middle age, one in an individual years old, and another in one of fifteen. Sixteen of the patients were les and five females.

3. Five of the cases could not be traced up to any communication with e sick; but 16 had been exposed to the atmosphere of the disease.

4. Stupor, more or less profound, was present in every case; being slight the beginning and gradually increasing to the decline of the fever, when several instances it was apparently carried off by a critical evacuation, in which cases the recovery of mental activity was always quick.

In one case the coma for three weeks was so unabated, that the patient, a female, was unconscious of everything that passed. In nine cases delirium was combined with coma.

5. In 13 cases, or about two-thirds of the whole, diarrhœa prevailed with more or less severity. It was characterized by dark watery discharges, occasionally greenish, which sometimes contained what appeared to be shreds of mucous membrane. The occurrence of this diarrhœa marked a violent disease. Under its prevalence there was rapid prostration of strength; the pulse became frequent and feeble, the tongue red and dry, and the thirst intense. A few of these cases were attended with epigastric tenderness, pain, and meteorism.

6. Hemorrhage from the bowels occurred in two cases; on the 14th and 21st days of the disease. In one the quantity discharged was only half a pint, in the other half a gallon. Both patients recovered.

7. Two cases were complicated with pneumonia, which in one supervened on the 24th day, in the other in the second stage of the fever. Both patients were cured, though the former was ill for several weeks.

8. In two patients there was a retention of urine which required the use of the catheter, and in a majority there was more or less distress in micturition.

9. The fever in its times of termination seemed to observe hebdomadal periods, terminating on the seventh, fourteenth, twenty-first, or twenty-eighth day; but when it became complicated with a local inflammation it lost this character.

10. In the treatment of this epidemic Dr. Dawson did not find bloodletting an available or valuable remedy. In the forming stage an emetic sometimes broke up the fever, and subsequently tartar emetic, as a contra-stimulant, moderated the febrile excitement. A mercurial action except

in the very commencement of the fever he found useless or rather injurious. Nevertheless, he speaks favorably of an extemporaneous *hydrargyrum cum creta*, prepared by triturating blue mass and prepared chalk together into a powder. He gave this as an aperient, when such a medicine was required, and, combined with opium, found it decidedly beneficial in checking the diarrhœa. The pneumonia was treated with fomentations, cataplasms, blisters, opiates, and mucilaginous drinks, to the exclusion of all other internal remedies, and the use of the lancet. To relieve the delirium he resorted to blisters and sinapisms over the spinal axis. Throughout the disease he allowed his patients to drink cold water *ad libitum*, and applied it freely to the surface of the body, and never saw it excite either rheumatism or pneumonia. As to narcotics and stimulants—he found opium valuable, but saw no benefit from the sulphate of quinine; he also used camphor, carbonate of ammonia, and alcoholic compounds, being on the whole favorable to a stimulating rather than a depleting course of treatment, but has not stated the circumstances and results in such a manner as to be transcribed.

10. Dr. Dawson has not spoken of the occurrence of a cutaneous eruption in this fever, nor has he reported any *post-mortem* examinations.

SECTION VII.

IN AND AROUND LANE THEOLOGICAL SEMINARY.

I. On what are called the Walnut Hills, about two miles to the northeast of the centre of Cincinnati, within half a mile of the margin of the Ohio River, and at an elevation of 320 feet above high water mark, is the literary institution denominated Lane Theological Seminary. The principal edifice, a brick building three stories high, is divided into dormitories, each of which has a single window and accommodates two students, who study and lodge in it. In the neighborhood there are many families who live in comfortable circumstances.

The Seminary was opened about the year 1832. The diet and lodgings of its inmates had at all times been of the simplest character. The majority of these ate but little meat, and a few refrained from it entirely; of course none of them drank any kind of alcoholic beverage. The same individuals generally remained two or three years. Early in the autumn of 1842, the epidemic began, and new cases began to occur till the last week of December, when they amounted to twenty-four, among the pupils, who then numbered sixty, and eight among the children of the neighborhood, in families. The physician who attended the greater number of the former, was Dr. Dodge, of Cincinnati, but Dr. Carroll, whose account of a similar fever in the eastern part of Ohio, has been already analyzed, was called to Dr. Dodge's assistance, and is the historian of the epidemic.*

* Western Journal, vol. viii. p. 321.

idents boarded and lodged in private families, and with one excep-
ped the fever. Six or seven being confirmed Grahamites, that is
ly herbivorous, boarded themselves, and all except one experienced
: of the worst kind. The individual who escaped was older than
and was said sometimes to indulge himself in the use of meat.
ight children, six belonged to families who had received patients
Seminary, but the other two were boys, not known to have had any
cation with the sick. All the physicians who waited on the sick
he fever, except Dr. Dodge, whose attendance was greater than that
rest, and he was not taken down till the 27th of January, four
ter the last case in the Seminary. The number of deaths was two.

ROMINENT SYMPTOMS.—These I shall give in the words of Dr.
—

rst, most of the cases began with slight indisposition, which gene-
tinued but a few days; headache was a frequent symptom, and
two or three days more, and then a chill of some hours duration
l the formation of the fever. During the whole forming stage,
illiness was experienced, particularly at the approach of night. The
mostly dry, though there was in a few cases partial sweating, which
occurred at night. This condition of the surface, however, did
ong; it became dry, and yielded to the touch that peculiar sensa-
h so generally belongs to typhoid fevers. The pulse was quick-
l more resisting than natural, and there was occasionally slight
listurbance, that sometimes continued either in an undiminished,
ated form, throughout the disease. The fever might now be said
pletely formed, and continued a longer or shorter time according
stances. A few recovered completely in two weeks, whilst others
n from twenty days to three months. Most of the patients were
ent in twenty-eight days. Through the first ten days, the tongue

symptom was, however, more frequent during the advanced stages, or after the first ten days. It often appeared day after day on but one cheek, and in the afternoon. It mostly preceded sweating a few days, but when this supervened, it subsided for some hours, and reappeared on the following afternoon. The pulse generally exceeded its natural frequency from ten to twenty strokes per minute. In some of the adults it was one hundred and forty, and in children occasionally more. It was generally regular, full and round, without much tension; in a few cases it was irregular, vibratory, tense, and sometimes feeble, though mostly resisting. In two of the fatal cases, the pulse was regular, round, and not hard until near the last. The hearing was affected in but few patients; in three of the fatal cases it was imperfect. Towards the termination of the fever sweating was frequent, though not universal, and had generally the effect of mitigating the fever; indeed, in many cases, it seemed to be the mode by which the disease left the system.

"The understanding remained clear for the most part, yet there were six patients in whom delirium supervened at some period of the fever. Slight wandering occurred in others, and was present, in a greater or less degree, in all the cases that terminated fatally, though not through the whole course of the disease.

"Sudamina appeared in six patients only, and in but one of those that terminated fatally; but the lenticular spots, considered essential to the typhoid fever of Louis, Chomel, Bartlett, and others, appeared in a well-marked form in but two cases. Both of these were children, one eight, the other four years of age. It is true, that there was in a few cases an eruption, but it was not of the kind that is considered essential to typhoid fever.

"There was either diarrhœa, or very easily excited bowels, in a large number of cases; indeed there were but few exceptions. The discharges per anum were generally of good color, but not consistent; and hemorrhage, so much to be dreaded, occurred in two cases only, which will be noticed by and by. Meteorism, and gurgling on pressure, were present in most of the cases; the former, in particular, to a greater or less extent in nearly all.

"This condition is not always brought about by unassisted morbid action, but in my humble opinion, by the mode of treatment, both as regards medicine and diet. Soreness on pressure over the region of the ileo-cœcal valve, could be discovered in most cases; and sometimes there was diffused tenderness over every part of the abdomen, though this symptom was by no means common. In a few patients there was irritation of the stomach, and medicine was retained with difficulty: this organ, however, mostly bore with ease whatever was taken. Most of the patients had considerable thirst, and desired cold drinks. Abdominal pains were not unfrequently present, and in a few cases were severe; bleeding from the nose was not an uncommon occurrence towards the close of the fever."

This, also, I shall transcribe from Dr. Carroll's account.

t was conducted with a perfect understanding of what each had done; ry steady course was pursued throughout.

of our first objects was to see that the patients had apartments suffi- arge and well ventilated; and that their bed and body linen should ntly changed. In accomplishing these objects we experienced but iculty, as a number of those who fell sick were kindly invited to s of the professors, or wealthy neighbors, where every friendly office ptly and cheerfully performed. Those students who were not sick urses in turn, so that proper attention was paid, both by day and It may be added, that as all the adult patients had well-cultivated nd had arrived at definite conclusions as to the prospects of a future lness, without unnecessary despondency, was manifested in every far as I know.

n at the outset we found our patient with a strong, hard, and frequent indeed when the frequency was but little if any above the natural , with accompanying headache, and flushed face, we bled to ap- g syncope; immediately after, the warm dash was used, or sometimes onging, and in a few cases the cold dash was administered either over le surface, or on the head alone. The next object was to purge freely g from ten to fifteen grains of calomel, and following it in half an hour with a free dose of salts, jalap, or oil. I was, myself, favorable to the lap, and therefore gave it, in preference to the other articles. After cing the system, it was agreed to direct the warm shower or sponging w hours during the first several days; and afterwards less frequently. tious that all the patients should take tartrate of antimony in minute roughout the disease, until the approach of convalescence or sinking; irritated the bowels or stomach, opiates were to be added, or used nt it; and in those cases in which the diarrhœa was difficult to con- antimony was to be discontinued. Occasional small doses of calo-

evacuations daily it was thought would be sufficient. My own predilections led me to favor the use of jalap or Epsom salts for this purpose. Dr. Dodge preferred salts, while Professor Mussey had a very decided opinion in favor of rhubarb and soda combined; in cases of debility this combination had a good effect. Often no cathartic medicine was administered for days in succession. Emetics we occcasionally tried, and found them beneficial in several cases; in one, however, vomiting had an unfavorable effect. Probably no certain rule can be laid down to govern the use of emetics in fever; and in those of a remitting or intermitting type, they not unfrequently seem to act disadvantageously; in continued fevers, however, they operate with more advantage.

"When the abdomen was in a meteoric state, with or without tenderness, or the bowels painful, fomentations of various kinds were prescribed, with dry cupping, blistering, &c.; scarifications with cupping were resorted to in a few cases. For pain in the head, or more serious affections of it, cold applications to the scalp with blistering, &c., were resorted to; the latter was of much service, the former more problematical. It may be proper to observe that in cases where bleeding was resorted to more than once, the patients were not benefited by the second operation; indeed I am opposed to bleeding after the first week, except in a few rare cases. I do not recollect that I have ever known a patient to recover, who was largely bled at a late period. Whatever brings the pulse below the natural standard in point of strength, has had, so far as I have observed, an unfavorable effect. At the outset we concluded it was only proper to moderate the force of the morbid action, rather than attempt to cut it short; as we considered the disease in a great measure of a self-determined character.

"It will be admitted that in a disease where there exists local lesions its force would benefit or prevent the progress of those lesions; and by this means enable the system to overcome the fatal tendency that otherwise would attend such lesions. Hence the benefit of moderating the force of the circulation in this fever. Advantage would then be derived from various means, as bloodletting, laxatives, diaphoretics, &c. But of all the means within the reach of the profession none seems to me equal to the tartrate of antimony, when given in such way that the stomach shall not be disturbed by it, yet that the circulation shall be brought under its control, which will be known by the pulse becoming less frequent, less hard, and less constricted, or more natural in its action. Small doses will, when continued during several days, gradually bring the action of the heart and its arteries under its influence, so that the frequency of the pulse will be lessened two strokes or more per minute, at the same time that all the other symptoms will be mitigated—the skin will be more natural, the heat more regularly diffused, headache, if it exist, will be moderated, and the various secretions more normal."

In a subsequent part of his paper Dr. C. makes the following important remark:—

arried out in the treatment of a considerable number of cases during
t nine years, and I have not as yet been disappointed."

r detailing the history of a number of cases illustrative of the benefit
treatment, Dr. Carroll proceeds to give an account of five cases, four
ch terminated fatally, and the fifth recovered with difficulty, in which
etting was either omitted, partially employed, or deferred to a late
of the disease, which brings us to the

MORBID APPEARANCES AFTER DEATH.—CASE I. Mr. Olney, who
r several months lived on a diet exclusively vegetable, sickened on the
December, after several days of undefinable indisposition. The disease
pid in its course, and early in its termination. His pulse was 120, full,
ard, but he refused to be bled. On a subsequent day, when delirium
me on, Dr. Dodge drew a quantity of blood from a branch of the tem-
artery, which was followed by some mitigation of his symptoms.
the beginning, he had labored under subsultus tendinum. Sudamina
red on his neck and chest, but no rose-colored spots. In the latter
of his disease, diarrhœa supervened.

dissection, nineteen hours after death, the arachnoid was found opaque
herent throughout to the pia mater, which was unusually vascular; the
al substance exhibited numerous red points, but there was no effusion.
lower six inches of the ileum, several elliptical patches projected a
r more above the level of the mucous membrane, and a few of them
ted small ulcers. The mesenteric ganglia, connected with the diseased
, was enlarged, but not vascular. The spleen increased in size, was
ely pliable. No disease was found in the stomach, lungs, liver, or
parts.

E II. Mr. Kidder, who for some time had lived on a diet of brown
potatoes, apples, and water, was taken ill on the 4th of November.

severe pain in the right side of the chest. This was followed by paralysis of the left side, with an abscess of the brow of that side. Meanwhile, circular inflamed spots, terminating in little abscesses, and sloughing ulcers, appeared on the trunk of his body. Finally, two artificial openings were made, one about two inches from the anus, the other below the left trochanter, through which pus, fæces, and sloughs of cellular membrane were discharged. Before this time, the symptoms of the original fever, had, of course, disappeared, and for a while he seemed to be convalescent, but on the 15th of February he died.

In the *post-mortem* inspection of this remarkable case, Dr. Carroll was assisted by Dr. Warden and Dr. Lawson. They were not permitted to examine the brain. In the dorsal portion of the spinal cord, they found no disease. The left lung was in a state of adhesion, with a few ounces of effused fluid, and its inferior lobe was impervious. The upper part of the right lung was tuberculated. The viscera of the abdomen were in a state of atrophy. The stomach seemed nearly natural. The valv. conniv. were thickened and contracted. The solitary glands of the ileum appeared to have been inflamed; those of Peyer could scarcely be detected. In the head of the colon there was a cicatrized and an uncicatrized ulcer. The bladder was contracted and thickened in its serous and cellular coats. The mucous coat of the lower part of the rectum was in a state of thickening and congestion, and about an inch and a half above the sphincter on the left side there was an aperture that would admit the finger, through which the fæces had passed into the cavity of the perineal abscess.

Case III. Henry Goodman, twelve years of age, died in twenty days from the time of his attack. There was nothing remarkable in his symptoms, till about the sixteenth day of his disease, when, after having had a discharge from his bowels, he complained of severe abdominal pain. The next day his abdomen was swollen and tender, with a disposition to vomit, and laborious breathing. Four days afterwards he died.

Eighteen hours after death Dr. Dodge and Dr. Carroll examined the body. The peritoneal cavity contained lymph and fæces, and the intestines were agglutinated together. Some of the mesenteric ganglia were enlarged, and one of them contained a quantity of pus. The spleen was enlarged, blue, and tender. The lower fourteen inches of the mucous membrane of the ileum was of a dark venous hue, in the centre of which was a perforation large enough to admit a quill. It did not appear to have been within one of the oval plates, many of which below the aperture were perceptible, but seemed in a healthy condition. "The lungs were in a morbid condition." No lenticular spots or sudamina were perceptible on the body, either before or after death.

Case IV. Master Goodman, aged nine years, the brother of the foregoing, had been for some time apparently affected in the lungs. His mother had long been afflicted in that way. He was seized on the 1st of January, and

d on the 18th, having had the usual symptoms,—mild delirium, coma, l meteorism, with quick and laborious respiration. On examining the ly sixteen hours after death the spleen was found enlarged and easily ken down; through the space of three feet, the elliptical plates of the m, were all in a state of ulceration, without raised edges but excavated n to the muscular coat. The ulcerated spots and the surrounding ous membrane were pale. The right lung was hepatized in its lower t, and in a state of congestion throughout, surrounded with six or eight ces of lymph and serum. The left lung was nearly sound, but the pleura that side contained two or three ounces of fluid.

V. No other deaths occurred, and consequently no other *post-mortem* exinations were made. Referring to these in connection with the conclus of Louis, Dr. Carroll has the following remarks:—

"In the case of Olney, the elliptical plates were diseased in the manner d down by Louis, as essential to this form of fever; but the mesenteric nds were not affected in the way that this distinguished pathologist thinks cessary to typhoid; for instead of being rose-colored and softened, what w of them were at all diseased, were white in the centre, and much rder than usual. He had no lenticular spots nor sudamina. Death resulted in this case not from the condition of the abdominal viscera, but from lat of the brain and its membranes.

"In the two cases that occurred in Mr. Goodman's family, it has been bserved that the lesions were different. Neither of the patients had lenticular rose-colored spots, nor sudamina; but one had ulceration of Peyer's glands; yet the mesenteric glands were almost, if not altogether, free from disease. In the other, the elliptical plates were healthy, but there was a congested or inflamed mucous surface in a small part of the ileum, and that part of the mesentery connected with it, and several of the glands were affected in the manner Louis thinks essential to typhoid. Kidder's case seems to demonstrate that the elliptical plates really had never been diseased; but that the isolated follicles had been inflamed, though not ulcerated. Here, also, the mesenteric glands were found apparently healthy."

In the latter part of his paper, Dr. C. discusses the question whether this epidemic should be called typhus or typhoid according to the attempted distinction of certain writers, and comes to the conclusion that it combined many of the characteristics of both, without conforming fully to the definition of either.

SECTION VIII.

INDIANA AND ILLINOIS.

The prevalence of these fevers seems to be far less in the states just mentioned, than in Ohio. They are of more recent settlement, are less ele-

vated above the sea, and more infested with autumnal fever. In respectable communications from gentlemen residing at various points in the basin of the Wabash, whose names are mentioned in the topographical part of this work, I find scarcely a reference to the fevers we are now studying, except when they speak of the termination of occasional cases of remitting autumnal fever in a train of typhous symptoms. These secondary typhous affections, as we shall hereafter see, are occasional occurrences in every part of the Southern or Mexican Basin, and appear to be more frequent in some other regions than the one we are now considering.

CHAPTER IV.

LOCAL HISTORIES OF TYPHOUS FEVERS: SOUTHERN BASIN; KENTUCKY.

SECTION I.

IN BOURBON COUNTY.

THAT part of Kentucky which lies within and northeast of the basin of the river which bears the name of the state, has never been much affected with autumnal fever. Its surface is the driest, and it has been longest settled, the first emigration being about the year 1775.* From the beginning, sporadic cases of typhus fever have occurred; and autumnal remittent has at all times shown a tendency to a continued type. Within the last twenty or twenty-five years, the cases have multiplied, and many local epidemics or sub-epidemics have occurred. I will give an account of two which may represent the whole.

I. EPIDEMIC IN PARIS.—In the spring of 1845, I made a visit to Paris, Bourbon County, and collected from Dr. J. A. Ingels the following account.

The town is built immediately above the junction of two lagging mill-streams, Stonen and Hueston, which discharge their confluent waters into Licking River, through its south fork. They flow through narrow valleys, with rocky limestone beds. The town is as elevated as that of the country which surrounds it.

II. HISTORY.—According to Dr. Ingels, the fever began in the autumn of 1839, and continued to occur through the months of December and January. In February it declined, and in March ceased altogether. For two years before its appearance, that region had suffered from drought to such a degree, that springs and wells which never failed before, were dried up; and the streams which flow near the town were remarkably low and stagnant.

* See vol. i. p. 249–56.

It was confined to the town, affecting both blacks and whites, the rich nd the poor, and both sexes, indiscriminately. It was estimated that cases ccurred in at least half the families of the town. Young persons were ore obnoxious to it than the aged. Dr. Ingels' youngest patient was four ears old. In general, the patients were under puberty, yet a number were etween forty and forty-five. It seldom attacked the whole of a large amily—in most instances, one, two, or three only.

After the spring of 1840, sporadic cases only occurred in town, but it pread into the surrounding country; where up to the time of my visit, five ears afterwards, it continued to prevail more or less, as an endemic. As ate as the autumn of 1844, Dr. Ingels saw twelve or fifteen cases in a ingle family. His opinion was, that it spread by contagion; but I did not collect the facts on which that opinion rested.

III. Symptoms.—The fever generally made its attack in a gradual manner. The prominent symptoms of the forming stage were slight but protracted or frequently-recurring chilliness, a rapid pulse, lassitude, a whitish tongue, which sometimes displayed unnatural redness along its edges and tip, in most cases impaired appetite, dull headache, often a pain in the umbilical region; bowels either regular, or affected with diarrhœa, which, moreover, was often produced by cathartic medicine.

When the fever was established, the intensity of the heat was various. The pulse was oftener soft or natural in force than hard; its frequency was permanent and characteristic, being, generally, above one hundred; in a lady, forty-five years of age, it did not vary, for two weeks, more than five beats from one hundred and forty in a minute. There was seldom much nausea; the liver acted well, and the alvine discharges in almost every case were more or less bilious, but in many, they were sero-mucous. Coma, delirium, and subsultus tendinum were rare; noise and light produced but little impression; the nights were generally restless. In some cases there was a cough. There was commonly a circumscribed flush on one cheek. In a few cases a vesicular eruption (sudamina), on the upper extremities. The average duration of the fever was about four weeks. No *post-mortem* inspection was made.

IV. Treatment.—Although often consulted in the forming stage, Dr. Ingels did not succeed in arresting the fever in a single instance; nor, when fully formed, did any method of treatment produce that effect. Antimonial emetics, occasionally tried, were injurious by exciting diarrhœa. Ipecac. was less objectionable, but did not break the fever. All active purging did harm. A salivation was not often tried, for mercurials seemed to promote hemorrhage. Venesection was employed in a few cases, but without apparent benefit. In short, Dr. Ingels found all active treatment injurious, and was led to rely chiefly on the following: Abstinence from stimulating food and drinks, confining the patient to herb teas, gruel, and rice-water; abdominal fomentations and foot-baths, dry cupping, and sometimes scarification

of the abdomen; occasionally blistering of the same part; gentle aperients, such as the oleaginous mixture, alternated with gentle doses of calomel, the blue mass, and followed by small portions of acetate of morphia, ipecacuanha. The most dangerous symptom was diarrhœa, especially when the discharges were of a sero-mucous character. To relieve it, he found perfect rest and constant recumbency of great importance. Internally, opium, ipecac., acetate of lead, and nitrate of silver, were found beneficial. When checked, he would allow his patients to pass four, five, and even six days without an evacuation. Another troublesome symptom was intestinal hemorrhage, which was more common in the country than the town. It was checked by the same means as the diarrhœa. About one in twenty of Dr. Ingels' patients died.

The symptoms and effects of remedies seem to characterize this epidemic as typhus fever, whose ravages fell chiefly on the bowels, the brain and lungs suffering comparatively but little; and hence it seems to have been allied to the typhoid affection of Louis.

SECTION II.

IN SCOTT COUNTY.*

I. ORIGIN AND SPREAD OF A SUBEPIDEMIC.†—According to Dr. Sutton, for almost a year before this fever could be said to be epidemic, it occurred sporadically in Georgetown, the county town, and its vicinity. Of its origin he declares he knows nothing, as no local or temporary causes were observed to exist. On its dissemination he speaks with reserve, as in numerous cases it could not be referred to contagion, while in several that mode of propagation seemed manifest. I shall present a condensed account of these cases. 1. During the early part of the winter of 1845–6, when the fever was prevailing in Georgetown, Miss S. left it, indisposed, for a neighboring village of the county, called the Stamping-ground, where the disease did not exist. The fever was soon developed in her system and proved fatal. The fever quickly spread throughout the village, and it was believed that most of the first cases could be traced up to communication with her.

2. About the same time Mr. W. S. sickened with the fever in town and was removed to his father's, a mile in the country, where no case had as yet occurred. The attack was protracted and ultimately fatal. Some weeks after his death two of his brothers were severely attacked, and during their convalescence, two other brothers and two sisters sickened with the same fever and were ill at the date of the report.

* See vol. i. p. 252, No. VII.

† This account has been condensed from a MS. Report, by Dr. W. L. Sutton, to an association of his brethren, on the 11th of March, 1846. Since favoring me with the use of his manuscript, it has been published in Louisville by Maxwell & Co. and constitutes the most complete history which has been put forth, of any of our local typhous epidemics.

addition to these facts furnished by the recent epidemic, Dr. ours to the year 1841, when the fever prevailed in some parts of unty, and narrates the following. Miss. C. made, it was said, an l visit to the family of a relative who resided four miles from her, affected with the fever. On the 17th of May she herself was but recovered after a lingering illness. About the 20th of July, er and four negroes were seized, within a few days of each other; ie 22d of August another negro was taken down. The negroes f one family,—a mother and four children. Dr. Sutton justly re- e as examples apparently of contagious dissemination; but remarks, ier hand, that in an overwhelming majority of cases, no evidence opagation could be detected. The cases, he continues, were usually nd scarcely ever were there more than two or three in the same

MPTOMS AND PROGRESS OF THE FEVER.—The attack commenced r in the most gradual manner, and was characterized by symp- well defined nor easily expressed; the debility of both body and however decided, with great disinclination to every kind of effort. ases, however, a person in good health was suddenly seized with a mpanied with pain in the head, back, and limbs, followed by early action.

inal Symptoms.—In the beginning, the tongue in many cases al; but in others covered with white fur, through which red rojected, the edges and tip presenting the same color; with dimi- oisture, and impaired sense of taste. As the disease advanced it ammy and covered with a dark crust, which cracked in various , and the edges of the organ assumed a deeper red. About the , the lips lost their plumpness and moisture, and often cracked des collected on the teeth; and the patient manifested a disposi- k his mouth and nostrils. Frequently there was redness, and on g, a feeling of soreness in the throat with great thirst. The appe- ometimes lost, and very generally impaired; but cases occurred it continued with but little diminution throughout the whole the disease. Nausea and vomiting occurred in a few cases only. frequently began several days before the patient took to his bed; n absent scarcely ever failed to supervene in the course of the nd constitute a prominent symptom. It varied from one or two, or twenty liquid stools in the course of the day—varying much in consistence, and color. Sometimes they were but semi-fluid, then which they resembled in color, though generally they displayed de of green or yellow, indicative of a continuance of the biliary On the whole they resembled in consistence and color new cider. lly they were composed almost entirely of mucus; sometimes of us, and blood. With the progress of the fever they exhaled an

abominable, even cadaverous, odor. A few children discharged a considerable number of worms. In several cases when the fever was at its height, a large quantity of grumous blood was discharged from the bowels; which moreover was not the only kind of hemorrhage, for epistaxis was common. In the earlier stages of the fever, this was generally slight—in the more advanced, often profuse and alarming. There was commonly some abdominal soreness and tenderness under pressure, which was greater in the epigastrium and right iliac region than elsewhere. On pressing over the latter a gurgling noise was heard. After the first few days a certain degree of tympanitis was common, and not reducible by evacuation from the bowels. In a few instances the discharge of flatus was immense.

State of the Circulation.—When a decided chill ushered in the fever, the pulse was full and active, and continued so for a few days, especially in the afternoon; but when the chill was slight, the reaction of the pulse was always less. The chills never recurred at regular periods, and after the first were not of a marked character. In one case, the pulse varied but little from fifty beats in a minute through the whole course of the fever; and in mild cases was in general but little beyond its natural frequency. In the progress, however, of all the severer cases it rose to 100, 120, 140, or even more in a minute. It was commonly from five to ten beats in a minute more frequent in the afternoon than the morning, but in many instances it was nearly uniform throughout the twenty-four hours. As the fever began to decline, it generally abated rapidly in frequency, and soon fell to its natural state.

State of the Nervous System.—In many cases the physiognomy of the patient was placid and natural throughout the whole course of the disease, even when the issue was fatal. In others, there was a marked expression of anguish, which, however, sometimes ceased before death, and the patients affirmed that they felt very well. Many cases were attended with very little pain, and in those in which it occurred, it generally wore away with the first eight or ten days of the fever. Its seat was commonly the head, back, or extremities. The great muscular weakness of the forming stage already mentioned, in almost every case continued throughout the whole course of the fever. In some instances, it seemed in fact to constitute almost the whole disease. The patient would look and say that he felt well, but could not sit up. In the progress of the severer cases subsultus tendinum was apt to supervene. There was usually, in the earlier and middle stages of the disease, a morbid sensibility to light and sound, with tinnitus aurium, and inordinate wakefulness; but in the progress of the disease, partial deafness, somnolence, and slow respiration supervened. The state of the mind in the beginning of the disease was that of debility rather than perversion—the patient could not remember or distinctly state what had passed. To this succeeded low muttering delirium, especially at

ight; and in a few instances furious aberration of mind, which seemed maniacal.

State of the Skin.—In the earlier days of reaction the heat of the skin s generally decided, and in most cases, there was throughout an evening crease above the natural temperature. In many, however, after the first ys, the heat often fell and remained at, or even below, the standard of alth; especially that of the elbows, knees, and feet. In general the skin s dry, but not husky.

"Rose-colored, lenticular spots"—answering to the description of Louis—re not seen; but in a few instances there was an eruption of red spots, of uniform shape, on various parts of the body; which however did not ggest the "typhoid eruption" of that author. In some cases a "free op of sudamina" appeared; in others there was an extensive desquama- n of the cuticle, both where and where there had not been sudamina.

State of the Urinary Secretion.—In general this function was but little ered. In a few cases, the discharge was tinged with blood; in others re was retention.

Thoracic Symptoms.—These were in general either slight or altogether sent. When cough occurred, it was generally such as seems to be excited gastric or intestinal irritation. The respiration was occasionally acce- ated, with a sudden expiration. In a few instances, as the disease vanced, a mucous rattle was heard.

Prognosis.—Great frequency of pulse; protracted, profuse or obstinate rrhœa; rapid and irregular respiration; copious hemorrhage in the latter ges of the disease; subsultus tendinum, delirium, raving, and great tlessness, were symptoms of evil omen, to which might be added an im- ssion on the part of the patient that he was better when some of these ister symptoms were present. In some cases good and bad symptoms re singularly blended. Many cases terminated in health after a number alarming symptoms had appeared; and some proved fatal after apparent ssdment for several days. In two of these the symptoms indicated peri- itis from perforation of the bowels, but no *post-mortem* examination was mitted. In the latter periods of a violent case, the epistaxis was so fuse that the pulse became extremely frequent and feeble, and the scular strength was almost exhausted, and still, after the hemorrhage s restrained by plugging the nostrils, the patient recovered rapidly.

III. APPEARANCES AFTER DEATH.—Dr. Sutton has made but two *post-* rtem examinations in this disease, one of which was in 1841. The pa- nt, a negro woman aged forty-five years, was ill for twenty-four days, with ll-characterized vascular, nervous, and intestinal symptoms. On [illegible] n twenty hours after death, he found the stomach healthy, except a small nt of minute red dots. The small intestines, contracted in [illegible], re otherwise natural, except the lower portion of the ileum, which [illegible] ternally was dark and contracted. On laying it open, a [illegible],

varying in size from the circumference of a grain of wheat to that of a twelve cent piece, were discovered. They reached down to the peritoneal coat. The small ones had elevated edges, but the larger not. The intervening mucous membrane abounded in enlarged veins, filled with black blood. In the cæcum, upper part of the colon, and lower part of the rectum, ulcers were numerous. The calibre of the colon throughout was much diminished, and its mucous lining extremely dark. It contained a small quantity of semi-fluid fæces. Some of the mesenteric ganglia were enlarged, and portions of the mesentery were beautifully injected. There was very little blood in the vena cava, and the venous system generally was extremely empty. The omentum, pancreas, and liver were sound; but the spleen was enlarged and soft. The brain and lungs were not examined. The appearances in the other dissection were substantially the same.

IV. TREATMENT.—*Venesection.*—Dr. Sutton saw the lancet employed in three cases only. In one it did not seem to do either good or harm; in another it was followed by alarming debility; in the third it was employed at an advanced stage of the disease, and the patient died. He has not mentioned the appearance of the blood. Discouraged as to the use of the lancet, he was induced to resort to cupping, which he found beneficial.

Emetics were not often employed, but in the early periods of the fever, when there was a sense of gastric oppression, with nausea or headache, and there was no tendency to diarrhœa, they did good. In more advanced stages, when that tendency was great, emetic medicines passed off by the bowels, producing serous and bloody discharges, with great prostration and death.

Purgatives.—These were chiefly administered in the early stages of the disease, but even then drastics were avoided. Subsequently great care was requisite in their exhibition. Small doses of calomel or the blue mass, assisted with castor oil, were found the safest. Epsom salts and Seidlitz water were occasionally used, but the latter especially was often followed by griping and watery stools. Such effects sometimes even followed on the use of rhubarb. Dover's powder was found a valuable adjuvant to calomel and the blue pill, and tended to prevent hypercatharsis. When the quantity of calomel was increased for the purpose of procuring bilious and feculent discharges, it only increased the serous secretion and made the patient worse. When hemorrhage was present, he administered the blue mass, ipecacuanha and opium, which appeared to do good; as also did a dose of fifteen or twenty grains of calomel, and a large dose of opium alone; nevertheless, he saw other cases in which no particular treatment was employed, and yet the patent did well. As a means of opening the bowels in the latter stages of the disease, he preferred injections to everything else.

Sudorifics did not appear to be of much service, but applications to the skin often did good. Sponging it with cold or tepid water when it was too warm, was often followed by diminution in the frequency of the pulse and

them very certain. In some instances they excited intolerable
ry.

ctorants were occasionally demanded, of which he used mucilage with
and an infusion of seneca root with liquorice.

tes were occasionally administered with saline diaphoretics to ease
ay irritation and induce sleep. But their greatest value was in their
ing the diarrhœa, for which purpose laudanum was given in warm
y injection, or solid opium and Castile soap introduced into the
as a suppository.

ctant Treatment.—Dr. Sutton believes that the milder cases of this
ght have been left to themselves. They would run a course which no
nt could abridge, and at length terminate favorably. They all,
, required the vigilant attention of the physician, as those which
d the most favorable aspect at first, sometimes assumed a dangerous
r. This transformation was occasionally most gradual and insi-

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SECTION III.

IN OLDHAM COUNTY.

ISTORY.—Dr. D. L. Freeman has favored me with a short account
hous epidemic constitution which prevailed in this county, which
the Ohio River, above and adjoining Jefferson County, in which
lle is seated. Being a river county, it is more infested with inter-
and remittent fevers, than the interior of the state generally.

fever commenced in the spring of 1844, and continued as a sub-epi-
hrough the following summer and autumn. In the summer of 1845
ailed again; and many other forms of disease took on some of its

frequent, thrilling, but easily compressed pulse, surface heat, urgent thirst, and severe pains of the limbs, back and head, especially the last. The tongue was generally red, even at an early period of the fever, and when fur appeared, it was commonly on the posterior part, with a belt extending forward on the middle of the organ. Restlessness and sighing were common. The bowels were generally inclined to costiveness; but pressure over the lower and right side of the abdomen gave pain, and excited gurgling.

If at this time cathartics were administered, the discharges were liquid, yellowish, or greenish, and extremely offensive. With the progress of the fever, the pulse gained in frequency and lost in force; the heat of the surface became burning; the moisture of the tongue dried up, and sordes accumulated on the teeth; diarrhœa supervened, and the thin fetid discharges sometimes contained mucus dotted with blood. His nostrils often became stuffed with hardened mucus, tinged with blood when it was removed; a majority of cases, indeed, were attended with epistaxis. In this stage of the fever his intellectual functions became greatly enfeebled, with incoherence and subsultus; coma occurred, and he would lie with his eyes and mouth half open, being obliged to breathe through the latter from the obstructed state of his nostrils. When the disease was tedious, ulcers frequently formed over the sacrum. In well-marked cases maculæ of a petechial character appeared on the abdomen and breast. In cases attended with profuse perspiration, sudamina frequently appeared on the neck and chest.

III. Pathological Anatomy.—Dr. Freeman examined but one subject. The disease had been well characterized. The mucous membrane of the stomach was injected with blood. In following the membrane down the bowels, to the ileum, the hyperæmia reappeared. Many of the elliptical patches were inflamed and ulcerated, the ulcers having raised margins. The mucous coat of the cæcum was dark and softened. The spleen was engorged to the weight of twenty-eight ounces, and greatly but unequally softened, the gastric extremity seeming like a coagulum of blood. Of the other abdominal organs, Dr. Freeman makes no report, and examination was limited to one of the great cavities.

IV. Treatment.—The first treatment of this fever was with bloodletting, emetics, cathartics, diaphoretics, and a liberal administration of calomel, with a view to its effects on the constitution. This method was unsuccessful if not injurious, for the patients generally died. The bleeding diminished the fulness, but increased the frequency of the pulse; the cathartics promoted diarrhœa, and did not improve the quality of the discharges; the calomel did not promote a healthy secretion of bile, nor arrest the fever; while if continued long it produced ulcers of the mouth, which in some cases became gangrenous; or seemed to occasion suppurative inflammation of the parotid glands, always followed by death. Observing these sinister results, Dr. Freeman and the physicians of the county generally, abjured this practice and employed local bleeding, gentle aperients, mild enemata, counter-irri-

s, and stimulating diaphoretics; under which change of treatment the tality decreased to such a degree, that the profession of the county ac- d a settled conviction that copious bloodlettings, active purges, and ree use of calomel, should be entirely rejected.

e details of the method which Dr. Freeman found most beneficial, are llowing: When called early, he directed a general warm salt bath, subsequent rough friction of the skin; the patient then to be placed well-ventilated apartment, with sufficient bed covering, and the ex- n of society. In this condition, the excitement in some cases was that he instituted a liberal venesection. If the patient had been cos- e gave a mild cathartic aided by an enema. Local bloodletting then ed, especially around the base of the skull; the patient's hair was cut and cold water poured on or otherwise applied to the head, and a l use of demulcent drinks was ordered, with draughts of spiritus Min- . Subsequently he cupped over the spine, the epigastrium, and the iliac region, finding such benefit from the practice as encouraged o persevere. He washed the surface of the body with tepid salt water, ade subsequent dry friction. When the bowels continued torpid, he d them with enemata. When diarrhœa was present, he administered 's powder with hydrargyrum cum creta, and opiate injections; if did not succeed, he applied a blister over the abdomen, and covered rface with irritating dressings. After the early stages of the fever passed, he supported the strength of the patient with liquid diet, wine , and port wine. In the latter stages he resorted to the usual stimu- . In this stage, one of his patients became unable to swallow, when jected into the rectum a large quantity of wine with sulphate of qui- The patient was roused and recovery took place. In a few cases his nts survived involuntary discharges of fæces and urine. One patient ered, after lying eight days insensible to every external influence. her had an enfeebled and at times incoherent mind for several weeks the fever passed away.

e fever uniformly ran a tedious course, ranging from three to four ; seeming to be self-limited; and leaving to the physician nothing the duty of correcting the symptoms and sustaining the patient's gth.

CHAPTER V.

LOCAL HISTORIES OF THE TYPHOUS FEVERS OF THE SOUTHERN BASIN, CONTINUED.—IN TENNESSEE.

SECTION I.

IN SMITH COUNTY.*

From Dr. F. H. Gordon, I learn that a continued or typhous fever frequently prevails in this county. The notes with which he has favored me relate especially to the disease, as it appeared in the years 1844, '5, and '6. It has received the name of winter fever, although it is not limited to that season. It affects persons of both colors and of all ages, infancy not being exempt. Dr. Gordon has given me the history of two cases, a mild and a malignant one, which he says will serve as specimens of the whole, both in the symptoms and the treatment. The following is a condensed narrative of each.

Case I. Mild.—On the 4th of January, 1846, Cato, a negro boy, was attacked, and Dr. Gordon saw him two days afterwards, when he complained of head and backache, with muscular tremors, dizziness and great debility, nausea, and epigastric tenderness. His feet were cool in the morning, but with the surface generally hot and dry the other portions of the day and night; his urine was scant and reddish; his tongue was red at the tip and edges, but covered with white fur in the middle; his alvine dejections were rather frequent, and consisted of a yellowish water; his pulse was frequent, small, and somewhat corded. He was bled till his pulse became fuller and softer; and ordered to take three grains of calomel and the same quantity of Dover's powder, every three hours, till three doses were taken. On the next day, January 7th, his evacuations were greenish, liquid, and copious—his abdomen painful, tender, and a little swollen. Ordered large hot poultices of bran to the abdomen to be renewed every twenty minutes, till the pain and tenderness abated; also half a grain of tartar emetic and five grains of sulphate of magnesia every two hours; and a grain of acetate of lead, and three grains of Dover's powder, at short intervals, if the alvine discharges should be frequent. Dr. Gordon did not see the patient on the 8th or 9th, but on the 10th he found him much better. The soreness and swelling of his abdomen were gone; his alvine discharges were feculent but rather thin; his appetite was restored and he slept well. He now discontinued the antimonial, but continued the Epsom salts; under which the recovery was so rapid that on the 14th, ten days from the time of his attack, the boy went out on the plantation.

* See vol. i. p. 236, No. VI.

tion, delirium during the exacerbations of fever, intense thirst, abdominal tenderness, and frequent discharges of yellow water. s 110 in a minute. Dr. Gordon bled him to fifteen ounces, calomel, blue mass, and Dover's powder, each six grains, to divided into two portions, the second to be taken six hours ; also one grain of acetate of lead and two of Dover's powders, vals, to moderate the action of the bowels. Bran poultices as ase were likewise directed to the abdomen. Not expecting to t for a day or two, he farther ordered, that when three or four ad occurred after commencing the use of the calomel, five grains f magnesia should be given every two hours, till the alvine dis- ne natural. His next visit was on the evening of the 25th, d that the last item in the prescription had not been given, r that it would purge too much. His patient now had invo- arges of greenish water, wild delirium, dilated pupils, a vacant ed features, and great restlessness ; the surface of his trunk and her warm, that of his extremities too cool ; his thirst was ngue dry, rough, and red, his abdomen swollen and tender, 140 in a minute, small and undulating. Blisters to the ankles, e feet, and hot stones were immediately ordered ; and at the tream of warm water was directed upon the abdomen and con- rruptedly for three hours, at the end of which time the feet had ted and warmed, the circulation was equalized and the patient Hot bran poultices were then applied to the abdomen for d after that a blister. During the two latter applications a d water was directed upon the head. Internally small doses s, nutmeg, and acetate of lead were ordered.* On the after- next day, 26th, Dr. Gordon found that his patient had passed

directed in addition. On the 27th the patient was still better, and the same treatment continued, with the addition of a grain of the sulphate of quinine, and half a drachm of spirit of nitrous ether every three hours through the forenoon. On the 28th he was much improved in all respects: an occasional dose of infusion of quassia was added to the treatment. On the 30th his appetite was restored, his skin natural, and his alvine discharge nearly healthy. On the 5th of April his convalescence was advancing favorably, on the 12th he was able to sit up, and on the 20th went abroad.

In reference to the treatment pursued in these two cases, Dr. G. remarks that it has been uniformly successful in his hands, and that during the winter of 1845, '46, he saw more than a dozen cases as violent as the second. It is admitted by all the physicians of his neighborhood, that irritating applications to the primæ viæ are injurious. Some of his brethren give minute doses of calomel and blue mass throughout the whole course of the fever; but he limits their use to the first days. Indeed, in the winter of 1844, '45 he treated successfully a number of violent cases without any mercurial whatever. He places great reliance on minute doses of sulphate of magnesia, and acetate of lead, with warm and emollient applications to the abdomen.

It must be admitted that his method is somewhat *outré;* but on that very account it deserves attention. We have already seen that the ordinary and established methods are not attended with any encouraging success, and should, therefore, look with interest at any modification of practice which is declared to be successful.

CHAPTER VI.

LOCAL HISTORY OF TYPHOUS FEVERS OF THE SOUTHERN BASIN IN ALABAMA AND MISSISSIPPI.

SECTION I.

IN NORTH ALABAMA.

As Tennessee, the fevers of which we have already considered, is separated from Alabama by a conventional line,—the 35th parallel of latitude, the southern portions of the former and the northern of the latter make, in medical topography and climate, one region, everywhere jutting up against the bold escarpments of the Cumberland Mountains on the southeast, also on the south, southwest, and west, for a spur of that mountain winds round to the north. In this region lies the Great Bend of the Tennessee River, embracing most of the district in its ample concavity.*

* For a sketch of the geology and medical topography of this district, see Pl. I. (frontispiece) of vol. i. and pp. 222 to 225.

in the negro family of Dr. B., who lived a few miles out of Colum-
successively attacked all the negroes on his plantation. Dr. Frier-
ier resided in the neighborhood, and the two families had constant
se. In a fortnight from the beginning of the disease in the family
rmer, it commenced in that of the latter gentleman. A married
Ir. Frierson, who resided three miles from him, visited the family,
ip with the sick as a nurse, took the disease and died. The physi-
colored nurse, who waited on him, both suffered attacks of the
d. Two other sons, who were at school, ten miles off, visited and
with the family two days. In nine days after returning to school,
hem was seized with the fever, and in three days afterwards it at-
ie other.

ndebted to Dr. J. T. Sowell, of Athens, for the following notice of
ous fevers of that town and the surrounding country.

North Alabama, previously to the years 1832 and '33 (when
cholera prevailed in the United States), the people and physicians
knew of any other form of fever than the autumnal bilious, which
much more in some localities than others. Since 1832, it has
much less, and within the last few years is scarcely met with.
ndemic declined, there arose a tendency to morbid sensibility and
tion of the stomach and bowels, strongly contrasting with the torpor
nsibility which those organs had previously displayed. For ten or
ears after this change commenced, almost every form of disease was
terminate in, or be complicated with, gastro-enteritis. During the
or eight years febrile affections have assumed a typhous character.
nge did not take place with sudden and epidemic violence, but in-
and imperceptibly. The new modification seemed to approach
west, and made its impress gradually on existing diseases, till

communication with others affected, certainly for months before, if ever; and often but a single case would occur in a family, though all its members waited on the sick. On the whole Dr. Sowell is convinced that it has not spread by contagion. Of auxiliary causes he says, that as in former times whatever exhausted or perverted the powers of the system, as a debauch, wounds, &c., brought on an attack of bilious fever, so now the same or like causes bring on an attack of typhous fever.

III. The onset of this fever is scarcely ever sudden, but slow and stealthy. The patient continues for several days to complain of languor, listlessness and indisposition to mental as well as bodily effort, accompanied with anorexia, and either costiveness or diarrhœa, the former most frequent, but in both conditions there is an undefinable sensation of uneasiness in the bowels. In the early stages the tongue is coated with a thin white fur gradually becoming longer and heavier; its edges and papillæ are red, and its anterior portion is compressed laterally, till it assumes a remarkably pointed form. This aspect of the tongue is palpably diagnostic of the fever. Sometimes, however, the appearance of the organ continues healthy. The pulse is accelerated in frequency. With the progress of the fever delirium, coma, and subsultus tendinum are common; diarrhœa not quite so frequent. Tenderness in the right iliac region with gurgling under pressure is invariable and highly pathognomonic; as are the great weakness and obtuse pains in various parts, but most frequently in the legs. In some cases the pain and soreness could be traced down the thigh along the course of the nerve to the gastrocnemii muscles, the feet and toes. In other cases the pain was along the crest of the ilium or in the sacrum. Pain in some one of these regions was present in every case, and regarded by Dr. Sowell as characteristic of the fever. In one case paralysis of the arm occurred, from which recovery took place. Hemorrhage from the bowels sometimes took place; but petechiæ and sudamina were not seen. During convalescence, all who had been seriously ill, lost their hair, but it was soon reproduced. A puffy or bloated aspect often followed the disease, accompanied by a feeling of inertness. From the prejudices of the people Dr. Sowell could not make any *post-mortem* inspections which he regards as worthy of being reported.

IV. Treatment.—Dr. Sowell's experience has convinced him, that medicines are palliative not curative in this fever, and that the disease will run its course. When attempts have been made to hurry the cure, injury has been the result. Little more could be advantageously done than to restrain the bowels when too loose, with a little paregoric or Dover's powder; or assist them when too slow with small doses of castor oil, or some saline aperient. For the hemorrhage, he found nothing equal to creasote, and for tympanitis, oil of turpentine was the best remedy. Counter irritation was of little value. Cold applications to the head were acceptable,

and sponging the surface of the body produced quietness. Stimulants, generally desired by the patient, were administered with advantage, as they contributed to fulfil the great indication, that of sustaining the strength till the fever should run its course.

SECTION III.

IN BENTON COUNTY, SOUTH ALABAMA.

I. THIS is one of the hill counties of South Alabama, lying between the upper waters of the Coosa and Tallapoosa Rivers, a region not described in the topographical portion of this work. The surface is hilly, with pine barrens, and the rocks beneath are calcareous. Its latitude is a little below the 34th parallel. Dr. Geo. R. Grant, now of Memphis, Tennessee, resided and practised his profession in this county for four years, that is, from '40 to '44, during which he met with the subepidemic of which I am about to give an account.

II. Colonel J. removed from Georgia to Benton County in the winter of 1840–41, bringing with him about seventy negroes. They were lodged in log cabins, built on an eminence, with tight floors, and they were sufficiently elevated above the ground, and closely chinked and daubed between the logs. Each had a door, and on the opposite side a small window, with a shutter. Each lodged a family, which sometimes numbered eight or ten individuals. A small stream, notorious for the production of autumnal fever, meandered near this quarter. On the plantation, in the spring of 1841, without any evidence or suspicion of introduction, a continued or typhous fever broke out, and prevailed till forty-eight cases had occurred, of which one-fourth proved fatal. Nearly all the patients were adults under forty, of both sexes; very few children suffered. Before proceeding to detail the symptoms, I must give an account of the apparent communication of the disease to another family. Mr. A., Colonel J.'s overseer, was seized with diarrhœa, which as we shall presently see, ushered in the fever; whereupon he left the plantation for his father's house, seven miles off. At that time, as far as Dr. Grant knew, the fever prevailed nowhere but on Colonel J.'s farm, and certainly had not occurred in the family of Mr. A., the father. In a fortnight after the overseer reached home, being affected with the fever, his brother was seized with the same kind of diarrhœa, followed by fever and delirium, which lasted two weeks. During his illness a sister was attacked in the same manner, and a few days afterwards another sister, all having the initiatory diarrhœa, with subsequent delirium, and continuing ill about a fortnight. Further than this the fever did not spread in or from this family. We must now return to a description of the disease.

III. SYMPTOMS.—The attack was generally gradual, and almost every patient had diarrhœa, while he still went about. On this supervened ano-

rexia, dull headache, and great lassitude. There was seldom any chilliness. In the second stage, there was a quick, frequent, but easily compressed, pulse; hot skin, and white furred tongue with red edges and tip. Under pressure there was, in some cases, epigastric tenderness, but the same condition, with actual pain, was much more common, in the right iliac fossa. A certain degree of remission in the febrile symptoms was perceptible in the morning. There was rarely any deep coma. Delirium at length supervened, and in the second week of the fever, was in many cases of a boisterous kind; sometimes in its character it approached to *mania à potu*. The diarrhœa which ushered in the disease, was prone to continue throughout its whole course. The discharges, from the beginning thin and yellowish, became at length extremely offensive, and were always rendered more watery by cathartics. In the latter stages of the disease, the redness and rawness of the tongue increased. In many cases there was subsultus tendinum. The fever generally terminated in about a fortnight. In a few cases there was cough and slight expectoration, but no signs of pulmonary engorgement.

This description, drawn chiefly from the patients on the plantation of Colonel J., is applicable to the disease as it appeared on other plantations in subsequent years.

III. POST-MORTEM APPEARANCES.—*Case I.* In the spring of the year 1844, a negro, twenty-four years of age, died of the characteristic symptoms, including of course diarrhœa. He also had cough, which was not present in every case. He had taken great doses of calomel, under which he had profuse and exhausting alvine discharges. His brain was not examined. The lungs and heart were sound; as were the stomach, liver, and gall-bladder. The spleen was enlarged and softened, though the patient was not known to have had intermittent fever. Many of the glands of Peyer and Brunner were inflamed and ulcerated; and the intervening mucous membrane was in a state of hyperæmia. The colon presented very little ulceration.

Case II. A mulatto girl, aged fifteen, on the same plantation with the last, died at the end of the fourth week. She had experienced but little delirium, and at one time seemed to be convalescent. Had been treated with gentle evacuants, and the sulphate of quinine. The brain was not examined. The thoracic viscera were healthy; and so were the stomach, liver, and gall-bladder, which was distended with yellow bile. The spleen was tumefied and tender, notwithstanding she had never had an attack of autumnal fever. The mucous membrane of the entire ileum was inflamed, and presented many large spots of ulceration, not confined to the elliptical patches. The colon was normal.

IV. TREATMENT.—In a few cases Dr. Grant employed the lancet, but to no good effect. Local bleeding did better, especially when there was any pulmonary affection, for which likewise he blistered. He gave no emetics,

purgatives very sparingly, for in fact purging always seemed in-
The physician who treated the first cases on the plantation of
ave large doses of calomel, and every patient died with hemorrhage
bowels. Dr. G. himself was induced to try drachm doses of that
for which he hopes to be forgiven, under a resolution never again
to a practice so mischievous. He administered calomel, however,
portions, with Dover's powder, and saw benefit from the practice.
ave small doses of acetate or sulphate of morphine in acidulated
r, with some good effects. The oil of turpentine administered in
vehicle, in a few cases seemed beneficial. The sulphate of quinine
od. When a crisis was at hand, he found wine of service; but on
, he found it best to moderate particular symptoms, and leave the
ature.

reference to this epidemic Dr. Clarke says: "In August, Septem-
October of 1840, in Benton County, a typhoid fever prevailed as
ic, assuming frequently a malignant, obstinate, and unmanageable
. It attacked, indiscriminately, individuals of all ages, without
sex or color. During the prevalence of this fever, we had also
de and variety of intermittent and remittent, throughout the sum-
hs, but all the *fatal* cases were of a typhoid character."

fever—typhoid—was not ushered in by any distinct chill, but was
s in forming, and crept slowly on the patient. They grew dull;
d of being unwell, 'and weak;' the skin became dry and harsh;
s anorexia, headache, stupidity, and sleeplessness; there was at
degree of constipation, subsequently diarrhœa; finally, more or
was developed, the pulse becoming accelerated, but always com-
in some cases from 75 to 90, in others from 100 to 120. The
ally became hot, especially about the head and across the abdo-
some there was a tendency to coldness of the feet, which was diffi-
move; in others the feet, like the rest of the surface, became hot.
ue by degrees assumed a redness on the edge, and in some bad
dry and fissured, there was dryness of the mouth, and constant
water.

marked symptom usually prevails in every case, viz., *intense pul-
the carotids;* the alvine evacuations frequently change as to consis-
l color; the abdomen becomes tympanitic, in some cases highly so;
a few nights, insomnolency and delirium.

fever generally lasted from fifteen to twenty-one days, and it was
to six weeks after the patient complained of being unwell, before
n to health."

natomical character of this fever, according to Dr. Clarke, consisted
ement and softening of the spleen; a dark leaden appearance of a
of the mucous membrane of the small intestines, with here and
ickened, dark, ash-colored spots in the ileum, which were easily

scraped down. Very little redness was noticed anywhere in that bowel, but on the contrary, it had a pale darkened appearance.*

SECTION IV.

FURTHER SOUTH—IN AND AROUND DALLAS COUNTY.†

THIS region is greatly infested with periodical or autumnal fever. In his paper on the diseases of Alabama,‡ Dr. Lewis, in speaking of what he calls typhoid fever, observes:—

"The first information that is presented to our notice of its appearance in a marked form, was in Dallas County, during the spring of 1835. In this instance it was the sequence of typhoid pneumonia that had prevailed during the previous winter, assuming at that time an irregular intermittent type.

"A planter in this county, for the purpose of procuring manure for some worn-out lands, had exposed to the weather, several hundred bushels of cotton-seed, which during the latter part of December, became completely saturated with water; the heat retained in so large a mass, soon set up very active decomposition. Some fifteen or twenty negro houses were situated in a circuit immediately around the spot where the seed were exposed. About the middle of January, several cases of pneumonia were developed among the negroes, which continued occasionally to attack them until the month of March. The spring opening warm, the disease immediately assumed a new type, and continued to prevail, until every negro above the age of five years had been seized. The attack in these cases was insidious, the disease forming very slowly; there was a slight remission every morning for five or six days, after which it became continued, with clammy skin, quick compressible pulse, diarrhœa, coma, and sordes of the teeth; the disease ran its course in from fifteen to twenty-five days; average mortality about twenty per cent.

"Dr. Pearson mentions a striking instance of a similar character, and as such facts when clearly ascertained, cannot fail to assist in the most important of medical inquiries, we will here quote from his esteemed favor.

"'The past winter, a friend of mine had his gin house burned down, in which there is a great deal of cotton-seed and cotton in the seed. This pile was burning for weeks. As his stock used this yard, the ground, which was prairie, became soft from the treading of the cattle; there being also a good deal of wet weather, it gave rise to a collection of water over the charred seed, which became peculiarly offensive both to the eye and olfactories; with myself, it produced a paroxysm of sneezing.

"'It was on the south side of his negro quarter, the inmates of which be-

* New Orleans Med. and Surg. Jour. for July, 1847, pp. 9 and 33.

† See vol. i. pp. 184–5, No. III.

‡ New Orleans Med. and Surg. Journal, July, 1847, p. 31–2.

k. The first cases were of typhoid and pleuro-pneumonia, and after her became warm, it assumed the type and character of typhoid fever. nbers of his family, both black and white, remote from the *quarter*, ı not more than two hundred yards distant, but in an easterly ı from the contaminated spot, were exempt from the disease. I feel that this disease had its origin as stated, and strictly local, as the ighborhood was healthy. There were as many as sixty cases, and were benefited by quinine.'

se and other instances, which we have not space to detail, are sufficient e the belief that the decomposition of cotton-seed by process of fer- n, produces a gas, probably the ammoniacal, which affects a majority who may be subject to its deleterious agency. These effects of ill vary with the change of season, and in that revolution the con- of the atmosphere induces varied types.

have repeated instances presented to notice where low, dirty build- ome the place of deposit for filth, acted on by moisture, or the of the logs with which a large portion of our country houses are ted, becoming the medium of disease.

hoid fever, as usually presented in this section of the country, is vari- its character, in many cases attended with grave and malignant s, owing in a great measure to locality; as for instance, in our prai- low bottom lands; whilst on the other hand, there is more vascular nt, and inflammatory action in the hilly region of country.

he former instance, Dr. Hogan, in his letter, says: 'The disease is ushered in by a chill, not unfrequently a double tertian; the fever mittent, with partial perspiration, great enteric irritation, termina- pecial congestion, with a species of *paralysis agitans*, or meningitis ervene. There is more or less pulmonary congestion that is pre- y cerebral disturbance, sometimes in the form of delirium, and at nes it may be attended with stupor, or coma. In brief, typhoid y invade by the brain, the lungs, or the bowels, and in the grave these organs are apt to be involved, and your patient may die from on, in a physiological condition.

henever a patient is found with a dry, red tongue, excessive tenderness domen, small, fluttering, or wiry pulse, that is easy to be compressed, dull, leaden, and watery, morbid condition of the cerebral organs, bowels easily excited to action, we should not hesitate, under ordi- cumstances, to pronounce it a case of typhoid fever of the low

phoid fever prevails in autumn, winter, and spring; most usually the nd is met with annually in various sections of our country, either , or prevailing as an epidemic on some particular plantation, attri- to local causes.'"

SECTION V.

IN MISSISSIPPI, CARROLL COUNTY.*

I. HISTORY.—Dr. Edward Montgomery has kindly furnished me with the materials for this notice, in a letter dated in July, 1846, at which date he had resided there between three and four years. During that time he had treated about forty cases, eight of which proved fatal. They were scattered through the three years, but occurred chiefly in the summer of 1844, when the fever assumed an epidemic character. Cases, however, occurred every season, and so often in cold weather, that the inhabitants had given it the name of "winter fever," a fact that seems to indicate its occurrence in that county previously to Dr. Montgomery's arrival. In 1844, it attacked the inhabitants of a part of the county which had been regarded as the most healthy, and was limited to about three square miles. It affected whites more than blacks; the delicate and the robust were equally liable; of whites, those between fifteen and thirty; of blacks, those between eight and fourteen, were most liable. Most of the subjects were natives of the South, but not all of that county, which had not been settled more than fifteen years. He often saw a single case only in a family, but sometimes three. The duration of the fever was from eight to twenty-eight days. During this visitation, there was another local sub-epidemic twelve miles southwest of the one described. He saw a case, and found it to be the same fever he was treating. He heard of a planter in that neighborhood, twenty of whose negroes had it, of whom four died.

II. SYMPTOMS.—The fever generally commenced suddenly, with nausea, rigors, and pain in the head, back, and loins; in the reaction, the pulse was frequent, and the skin hot and dry, with thirst; the sleep was disturbed, and morbid drowsiness and vigilance sometimes alternated with each other; the bowels were generally costive, and the discharges dark-colored and very fetid; in a few days the pulse in many patients became extremely frequent and intermittent; the tongue was in some dry and brown, in others, moist and clammy, often tremulous and protruded with difficulty; active delirium was not uncommon; but sometimes there was great listlessness and indifference; in the advanced stages, the usual symptoms preceded a fatal termination: they were low delirium, subsultus, picking at the bed-clothes, sordes on the teeth, and unconscious discharges of fæces and urine. From the commencement to the termination, the fever was continued, or marked with very slight remissions. No *post-mortem* inspections were made.

III. TREATMENT.—Dr. M. pursued the same treatment he had followed in the typhus fever of Scotland and Ireland, only "modified to suit t[illegible] relaxed constitutions of a southern climate." If called early, patient was robust, he bled once from the arm; afterwards, or whe[n]

* See vol. 1 p. 209, No. III.

was omitted, he scarified and cupped the cervical and upper dorsal portion of the spine, extending the application to the epigastrium when there was great nausea or sense of oppression in that region. Having done this, he gave an active cathartic of calomel, jalap, antimonial powder, and some aromatic. After these evacuations, he relied for a few days on refrigerants and other antiphlogistics, as sulphate and bitartrate of potash, sulphate of potash, infusion of digitalis, with hyoscyamus, Spiritus Mindereri and effervescing draughts, with gentle opiates. He also gave more or less of a mixture of chalk and quicksilver, blue mass, and ipecac. in pills, especially when the bowels continued torpid. He depended greatly, however, on the application of cold water over the head and trunk of the body. When the vital forces began to fail, he applied a blister to the head and neck, and began the administration of sulphate of quinine, brandy, wine-whey, carbonate of ammonia, and other stimulants; keeping the head at the same time under the influence of cold water.

The history of this fever seems to mark it as typhus, rather than typhoid.

SECTION VI.

EPIDEMIC TYPHOUS FEVER IN NEW MEXICO.

From the late lamented Dr. Josiah Gregg, author of the "Commerce of the Prairies," I received the following notice of a typhous fever in New Mexico.

"During my residence in Santa Fé, a well-marked and very fatal typhus fever (as I am now convinced it was) raged through all Northern Mexico. It originated in the southern or littoral provinces, about the year 1835, soon after the disappearance of the epidemic cholera. It thence gradually made its way northwardly, reaching the province of New Mexico in 1837, which it ravaged till 1840, when it was superseded, or at least succeeded by small-pox. During this period, the mortality was appalling, and, for those healthy regions, unprecedented. In a communication which I received from the Secretary of State, at Santa Fé, it is estimated that ten per cent. of the entire population perished, but this is probably an exaggeration.

"What appeared remarkable in this disease was, that it seldom attacked foreigners (citizens of the United States), and the few who were affected did not suffer seriously,—indeed, I never knew a single fatal case among them.

"Although apparently contagious, its propagation seemed almost confined to the different members of the families into which it was introduced, visitors being but little subject to the infection, if any existed. When it commenced in a family, it generally ran through all who composed it, except the foreigners who might belong to it. Their exemption, when equally exposed

to the specific remote cause, should be ascribed, I suppose, to national differences of constitution, diet, and modes of living generally."

[The author had intended here to introduce a note concerning Dr. Gregg, which, however, is not to be found.—ED.]

[Section VII. is unwritten. A memorandum refers to articles on the Fevers of Natchez, in the Western Journal of Medicine, also, to papers in the Medical Recorder and American Journal of the Medical Sciences; mentions also typhous fevers at St. Louis and St. Charles, but without references to sources of information.—ED.]

CHAPTER VII.

CONTINUED OR TYPHOUS FEVERS OF THE EASTERN OR ST. LAWRENCE BASIN.

SECTION I.

WITHIN THE UNITED STATES.

I. THAT portion of the Basin of the Northern Lakes which belongs to the United States, seems not to be as much affected with continued fevers as the eastern parts of the Southern Basin, over which we travelled in the preceding chapter. At first view, we might expect the more northern region to suffer most; but we must remember that a large proportion of the people live near the flat shores of the Lakes, or on the estuaries of the rivers which enter them, and therefore under very different topographical circumstances from those who reside in the dry and ridgy zone which stretches westwardly from the Apalachian Mountains in the Southern Basin. Thus the topographical neutralize or nullify the climatic conditions. In presenting the few meagre notices for which I have been able to collect the requisite facts, I begin in the northern part of the Basin.

II. AT FORT BRADY, SAULT ST. MARY.*—1. In the winter of 1826-7, Surgeon Pitcher, now a physician in Detroit, witnessed an epidemic at the *Sault*, which he regarded as the typhous mitior of the nosologists. In 1842, he gave me the following account of it. The population of that distant spot consisted of the troops in Fort Brady, and of Creole or Canadian French living around the Fort, in small, unventilated cabins. Its prominent symptoms were a dry and burning skin, dry tongue, costiveness, slight delirium, restlessness, and great debility. In some cases, the blistered surfaces became gangrenous. In many instances, it ran on for several weeks. None of the troops, but some of the French died.

* See vol. i. p. 334, No. V.

Treatment.—This was temporising. Venesection was resorted to in two r three cases only. Emetics were not used, and none but the mildest athartics prescribed. The carbonated alkalies, and in some cases, camphor nd opium were directed with advantage; but the chief reliance was placed n sponging the skin with cold or tepid water. In the latter stages, bark nd wine were often serviceable.

Dr. Pitcher assured me that this was the only time he had met with a typhous fever in the North.

2. In the winter of 1837–8, there was a second invasion, of which Surgeon M'Dougall has given the following account:—*

"Shortly after my arrival at Fort Brady, in October, 1837, scorbutic symptoms were manifested in every case of disease which occurred, such as spongy gums, with hemorrhage, unusual debility, coldness of the surface, and the sensation of sinking in the epigastrium. The whole command being put on a strictly antiscorbutic regimen, these symptoms soon disappeared without any recurrence. At this period, the first case of typhus was reported; but as I soon became a subject of the disease myself, I lost the only opportunity I have had of observing and treating this formidable disease.

"*Symptoms.*—Lassitude, loss of muscular power, tinnitus aurium, disposition to syncope, pains in the head, back, and extremities; difficult respiration; rigors; pulse irregular, small, quick, and sometimes hard; tongue clean and red, and bowels constipated. In most cases, within sixty hours from the attack, reaction was fully established; then the tongue became dark and dry, with hemorrhagic fissures, the teeth covered with black, tough sordes, the eyes red and watery, and the temperature of the skin increased, giving that peculiar tingling sensation to the fingers characteristic of the malady. If the disease continues, petechial blotches appear, followed by subsultus tendinum, delirium, extreme prostration, and death. A favorable prognosis is indicated by a gradual subsidence of the symptoms detailed, abatement of thirst and heat, moisture of the skin, disappearance of petechiæ, black discharges from the bowels, hemorrhage from the nose, deafness, and a turbid secretion from the kidneys. The duration of the disease was from one to two months.

"The treatment consisted in ventilation of the wards, strict police, and personal cleanliness, tepid bathing, and calomel and opium to correct the secretions, diffusible stimulants, particularly carb. ammoniæ, rubefacients, blisters, and occasionally cups applied to the epigastrium. Some of the cases were undoubtedly typhus syncopalis, but the general character of the disease was that of typhus gravior and mitior. The first case originated within the pickets, which are near twenty feet in height; the next occurred among the hospital attendants, then among the convalescents from other diseases, until, finally, all in the hospital, excepting the steward, were

* Med. Stat. of the U. S. Army, 1845, p. 72.

affected. The only case that proved fatal in hospital was a private under treatment for gonorrhœa. From the garrison, the disease extended to the village, and thence to the Canadian shore.

"The probable causes of the fever were, the long-continued prevalence of northeast winds, with rain, which, in this climate, is remarkably depressing to the powers of life—great accumulation of vegetable matter in a putrid state beneath the buildings of the fort, and in its immediate vicinity, confined air from the high stockade, and deficiency of acetic vegetables."

As this is the most northern post of the United States, I may mention that the Army Statistics, exclusive of the cases occurring in this subepidemic, give but seven cases of typhus in ten years.*

III. At Milwaukie.—When at Milwaukie, in 1844, I learned from Dr. Bean and Dr. Bartlet, that while they seldom have autumnal fever, either intermittent or remittent, a fever of a continued type is not uncommon. It prevails most in November and December.

Symptoms.—Its forming stage is generally protracted through one or two weeks. When established the pulse is full and frequent—sometimes tense, at other times quite compressible. Slight morning remissions are not uncommon. The stomach is often irritable, with retchings, and the bowels inclined to constipation; though diarrhœa occasionally occurs in the latter stages. In the beginning the tongue is covered with a yellowish fur, which becomes dry and brown, and in the progress of the fever, sordes collect on the fore teeth and lips. The eyes often become suffused. Mild delirium, subsultus tendinum, and coma occasionally occur. The duration of the disease is from two to four weeks. Affects the young more than aged.

Treatment.—Dr. Bartlet resorts to the lancet in a few cases. Purges with calomel and rhubarb, sometimes quickening their action with Epsom salts, till bilious stools are produced. Then resorts to diluents and diaphoretics, one of which is a watery solution of ipecac. To the head, he makes cold, and to the feet and epigastrium, warm applications. He has not seen beneficial effects from the sulphate of quinine.

Dr. Bean employs bloodletting and purging to a greater extent than Dr. Bartlet. The latter he effects in part with calomel, but does not administer that medicine with a view to its constitutional effects. After alvine evacuation he tranquillizes his patient with Dover's powder. In all other respects their practice is the same.

I may here state that in the towns of Michigan, Chicago, Racine, and Navarino, on the southern and western coasts of Lake Michigan, I was assured that typhous fevers were almost unknown.

IV. In the Interior of Michigan.—In returning from Milwaukie, inquiries on the island of Mackinac, at Port Huron, and Fort Gratiot, lower

* Med. Stat. of the U. S. Army, 1845, p. 73.

end of Lake Huron, and at Detroit, informed me that typhous fevers are nearly unknown at the first, very rare at the second, and never epidemic at the third.

V. Coasts of Lake Erie exempt.*—From Detroit to Buffalo, I visited nearly every coast town, of which the most populous are Toledo, Sandusky City, Cleveland, and Erie, and also many others lying at various distances from the Lake up to eighty miles, but never met with a physician who had seen even a subtyphous epidemic in that region. Occasional cases of pneumonia, accompanied in the latter stages with low delirium, coma, subsultus, and dry red tongue, were the nearest approach to typhous fever they had seen. Many physicians assured me they had not met, in years of residence there, with a single case of true typhous fever, yet all had occasionally seen the supervention of typhous symptoms on the ordinary autumnal remittent fever of that portion of the country. We may contrast this exemption with the severe epidemic visitations of the country fifty miles south of the Lake, and elevated about six hundred feet above it. In Buffalo,† where Dr. Trowbridge had resided thirty-seven years, I was assured by him there had never been a typhous epidemic, except the pneumonia typhodes of 1812–13 already referred to.

VI. Southern Basin of Lake Ontario.—This lake has the mean latitude of the four upper lakes, Erie, Huron, Michigan, and Superior, but a depression below their average elevation of 350 feet; I have therefore made it the subject of a separate section, that we may the better estimate the influence of altitude on the fevers we are now studying. We first examine the region on the southern side of the Lake, from the mouth of the Niagara River, to the head of the St. Lawrence.‡

VII. In the basin of Genesee River,§ I could not hear of a single epidemic or subepidemic typhous, except that of 1813 (Chapter I. Sect. II.). From Rochester through Avon, Genesee, and Mount Morris up to Pike, I found evidence that in the latter part of autumn remittent fever tends to a continued type, and before death puts on the livery of a typhous affection. In the winter moreover it is not uncommon to see the same phenomena, in combination with original pneumonia. In some autumns and winters, these typhous proclivities are greater than others, so great indeed as to approach an epidemic prevalence.

VIII. The basin of Oswego River, which includes most of the beautiful little lakes of Western New York,‖ is not more affected with the fevers we are now inquiring after, than the basin of the Genesee. In Geneva, Auburn, Syracuse, and Oswego, I could not learn of a single epidemic typhous visitation; but the general fact was recognized, that the remittent autumnal fever which in early times so severely scourged the first settlers, had in latter years assumed more of a continued and typhous character.

* See vol. i. pp. 358, 382.
† Ibid. p. 380, No. I.
‡ Ibid. pp. 392–406.
§ Ibid. 394.
‖ Ibid. pp. 400–405.

At one spot only did I hear of a subepidemic typhous fever, concerning which I collected the following facts.

IX. The township of Manlius lies ten miles southeast of Syracuse, where the sources of Onondago Creek interlock with those of certain branches of the Mohawk and the Susquehanna. This indicates much elevation. In the direction of Lake Oneida the surface is low and more or less marshy, and infested with autumnal fever. In 1847, Dr. Nims informed me, that for some time a typhous fever had prevailed among the inhabitants of the hill country, but did not affect those of the plain. In 1846 it commenced in July, and prevailed till winter. Its duration was sometimes protracted to seven weeks: when fatal it generally terminated in three. There was generally more than one case in every family which it invaded. About one-third of the cases proved fatal. The majority of its subjects were adults. Its type was continued, with a frequent, but not hard pulse; the stomach was not often irritable; but the bowels were affected with diarrhœa, and in some cases there were pain, tenderness under pressure, and tympanitis. Many cases showed a hemorrhagic tendency, by discharges from the bowels, and petechiæ. In a majority of his patients, there was delirium with subsultus tendinum. The state of the pulse prevented a resort to venesection, but he employing cupping in several instances; the quiet state of the stomach kept him from prescribing emetics. The blue pill, castor oil, and mucilages proved useful. When tympanitis supervened, he administered oil of turpentine, or balsam of copaiva, with benefit. In a few cases small doses of sulphate of quinine seemed beneficial. Mustard poultices to the abdomen, and subsequent warm fomentations, relieved the abdominal symptoms. During an attack of this fever, a child had cancrum oris, and lost a part of the teeth and alveolar processes of the upper jaw.

SECTION II.

IN THE CANADAS.

I. I CANNOT speak with as much confidence of the northern as the southern sides of the basin of Lake Ontario and Lake Erie, but the few places which I visited, and the letters which I have received from others, have not made me acquainted with a single typhous epidemic; though they indicate a typhous termination of autumnal fever, which in that high latitude is prone to assume a continued type.

On this subject Dr. Stratton* has published the results of his observations, on the fevers of that region,—the western portion of Upper Canada. The phrase which he employs is "malarial continued fever." The disease generally begins with debility, impaired appetite, slight headache, irritability of temper, or some unusual mental state. These symptoms increasing,

* Edin. Med. and Surg. Jour. vol. lxiv. p. 105, and lxvi. p. 74.

the abdomen; sometimes in the chest with slight cough. In many
head symptoms are mild; but in some, there is ardent heat of the
tense headache, followed by drowsiness, sopor, coma; and the
f intensity of disease ranges, by insensible gradation, from that of
mon continued fever, to that of typhous gravior." Those who re-
metimes have impaired vision or hearing for several weeks; and
main almost stupid for months. This fever may terminate in ten,
or thirty days. A majority of the cases end in a remittent or an
ent type. Commonly quotidian, sometimes tertian. When the
ion was fatal, the chief morbid appearances were "effusion on the
r within the ventricles of the brain."
ver generally commences in a sporadic manner in May, acquires its
n of intensity and prevalence in August, and is arrested by the
October.
ncet is employed in this fever only when the head symptoms are
but cupping is often resorted to. Dr. S. generally begins the treat-
th an emetic. He gives cathartics or laxatives almost daily; and
ain of tartar emetic three times a day, as long as the powers of the
lo not flag. Spontaneous vomiting he checks with opium, and a
to the epigastrium. Local pains are relieved by blistering. After
r twenty-five days, he gives a small quantity of wine, five or six
day, and after the disease has existed ten or fifteen days longer, he
all doses of sulphate of quinine, and when it takes on a distinctly
l character, large doses. Throughout the whole course of the fever,
s a liberal use of cold water externally, especially to the head, and
y, ice and acids. Sporadic cases of this kind of fever occur
the higher and cooler portions of the Southern or Mexican basin.
ve been already referred to as common in the Apalachian Moun-
here elevation compensates for latitude. They are compounded of

ut of ten strangers suffer an attack, which, however, may not happen eral months after their arrival. It has a mild inflammatory cha- ; but when protracted assumes a typhous aspect. It generally ter- s in two, but sometimes extends through four weeks. In its progress mes has seen it assume a remittent type. Beginning in a family it is apt to attack all the members in succession. Its onset is insidious. General *malaise*, chilliness, lassitude, and frequently diarrhœa, characterize the first stage. The reaction is accompanied by heat, thirst, and backache. The tongue, at first moist and white, with red edges, ultimately becomes brown and dry. In many cases, there is high excitement of the brain, with severe headache; in others the visceral complications are in the chest or abdomen. As the tongue changes in color, hemorrhage from the bowels and petechiæ sometimes occur. In visiting the General Hospital with Dr. Hall, on the 1st of September, I saw many cases of this fever. They were registered as "typhous." Nearly all h irritable bowels, and soft frequent pulse; some had furred tongue with re margins; some were slightly coma- tose, and a smaller number had r elirium. They were chiefly Irish, but not recent immigrants, for such w not admitted into the hospital.

It is obvious, I think, that this fever is the equivalent of the remitting autumnal fever of our more southern climates; at the same time its affinities with typhus cannot be denied. Indeed, I have long been accustomed to see sporadic cases answering to a fuller description of this fever, and always regarded them as identical with sporadic "typhus;" though in the early stages they might wear an aspect of a different kind.

But cases occur at Montreal which all concur in denominating "typhus." I am indebted to Dr. Hall for returns of the General Hospital for twelve years, which show the relative number of patients recorded as having "synochus" or "typhus." The former amount to 1502, the latter to 646, an annual average of 125 and 54, or more than two cases of "synochus" to one of "typhus." The same returns show the relative prevalence of the two fevers in the different seasons, the hospital year commencing with the 1st of May. From that date to the end of October, 894 cases of "synochus," and 415 of "typhus," were admitted. From the 1st of November to the end of April, 608 of the former and 231 of the latter. Still further, each has its maximum of prevalence in the same three months, August, September, and October, which was 474 for one, and 239 for the other. In all this, these fevers follow the law of the autumnal fever of lower latitudes; and as they do not differ as much in their symptoms and required treatment as the intermittents and remittents of those latitudes differ from each other, while we assign them to the same cause, I see no objection to ascribing the "synochus" and "typhus" of Montreal mon cause.

These Montreal fevers, moreover, like the autumnal fever further prevail both sporadically and epidemically. Thus, for half the years a

whole number of cases was 508; for the other half, 1640. The
umber was 65, the greatest, 896, or six times as many; an in-
e sufficient to stamp the latter with an epidemic character.
pathological anatomy of the Montreal fevers, I could not collect
ıation; but am able to give an outline of their treatment. Dr.
arely employed the lancet, but often resorted to the scarificator and
sometimes administers a dose of castor oil as the first medicine;
ıes gives an emetic, followed by ten grains of calomel, succeeded
a cathartic. Afterwards, he administers calomel and antimonial
alterative doses, alternated with the saline mixture, holding
potash and tartarized antimony in solution. Dr. Holmes bleeds
ly when the head is much affected, and frequently cups. Gene-
an emetic before any other medicine, then a cathartic; after-
ımel and tartar emetic, alternated with spirit of nitrous ether.
lemen sponge the surface of the body with cold water, and blister
local affections. When the strength begins to fail, Dr. Holmes
s opium and camphor, with calomel, and sometimes resorts to
and wine.

Trois Rivieres.*—Dr. Gilmore writes me as follows: "Endemic
fevers occur in some seasons, frequently prevailing from autumn
uing summer. They are most rife in close and crowded houses.
apt to spread through the whole family of children, and often
ılts also. They are evidently contagious. The chief inflamma-
lications are in the lungs. The best treatment is the antiphlo-
he mortality is commonly about five or six per cent."

Quebec.†—I was assured by Dr. Morrin that typhous fevers are
known in this city, those brought by immigrants excepted. In
ıth of the year, but especially the hot, there are sporadic cases of
fever, which may or may not assume a typhous character. But
ıous typhous fever has never prevailed as an epidemic. Even in
wer town, where the streets are narrow, and the small houses
titute of yards, while they are crowded with poor people, no fever
ıd has ever prevailed. The late respectable Dr. Racy, and the
able Dr. Parant made the same statements.

notices which make up this section are so brief and barren as to
ıat Canada is less infested with typhous fevers than the more
regions. But this cannot be true if we regard all continued fevers
ing to the typhous group; for the British Army Reports, after
a small per cent. of "typhus" and "synochus," show a very
cent. of what is designated as "common continued fever." Some
es under this head are perhaps mere ephemera, others phlegmasiæ
developed, and others autumnal remittent fever, assuming a
l type, as that fever is apt to do on the northern border of its

* See vol. i. p. 428, No. VII. † Ibid. p. 424, No. I.

geographical range. After making these deductions, the remainder, *par magna*, can be nothing else than synochus, which thus far we have classed with typhus. This "common continued fever" is far more prevalent in Lower than Upper Canada, and constitutes a sort of equivalent for the remittent fever, which, as we have seen, prevails much more in the latter than the former.

CHAPTER VIII.

IRISH-IMMIGRANT FEVER.

I. THUS far we have treated of continued or typhous fevers as indigenous diseases, occurring sporadically, and sometimes becoming epidemic or sub-epidemic. If they have in certain instances appeared to spread by contagion, they have not been traced up to a foreign source; and have, therefore, like our periodical fevers, been regarded as endemics of the Valley. We have, however, a typhous fever of *foreign* origin, introduced by immigrants, attacking them in some instances several weeks or months after their arrival, and not unfrequently extending from them to the native inhabitants. As this modification of typhous may become naturalized among us, it is proper to say something of it. To avoid all theoretical expressions, I have called it by the name prefixed to this section; the propriety of which will seem less questionable when it is stated that the fever is introduced almost exclusively by immigrants from Ireland; by the St. Lawrence, the Erie Canal, and the Mississippi River, chiefly the first.*

The late venerable Dr. Joseph Parant, Physician of the Port of Quebec, informed me that the continued fever of the immigrants began about the year 1820 or '21; but had been much more prevalent among them since 1832.

II. Dr. Douglas has given the statistics of the fever since that time, in a tabular statement of the number of immigrants, and the number of patients admitted into the quarantine hospital, from 1833 to 1847, inclusive—fifteen years. In every year, dysentery or some bowel affection had been complicated with the fever.

The average annual number of immigrants for fourteen years, before 1847, was 23,384, of which 291 were, on an average, received into the hospital for the diseases just mentioned. In 1847, or the fifteenth year of the table, the number of arrivals was 98,106, the number of admissions for

* In the month of August, 1847, I visited many of the towns and cities on the St. Lawrence, down to Grosse Isle, the quarantine station below Quebec, and saw much of this fever, then more extensively and fatally prevalent than it had ever been before. From the notes made at that time, and from the papers of Dr. G. M. Douglas, superintendent of the quarantine establishment, and Prof. Badgley and others of Montreal, contained in the third and fourth volumes of the British American Journal, the notes I am about to give, will be formed.

cannot explain the increase of sickness, but by a reference to the
lition of the lower classes in Ireland at that time, which at once
d to extraordinary emigration, and gave impetus to the prevalence
er which, as we shall hereafter see, was never absent from that
country. The relative number of the two sexes among the immi-
is not given; but of those admitted into the Hospital, the men were
romen as four to three, and children were to the former as about
even,—to the latter, as eight to nine. Of the men, about thirty-
r cent. died, of the women, about thirty-five, of the children, about
ine. Thus, it appears that the disease was most fatal in children,
t fatal in women. At the Immigrant Hospital, in Montreal, the
y was thirty-three per cent.* On an average, it was about twice
l as it has usually been in the hospitals of Dublin; a difference
ter than the difference of circumstances under which the patients
essarily placed in the ships which brought them over, and in the
ry sheds to which they were of necessity consigned at the quaran-
und.

Every ship which arrived presented cases of the fever among the
and officers, who were oftener than otherwise attacked after reaching

physicians, students, apothecaries, clergymen, nurses, and all other
nts on the island, amounted to 328, of whom no less than 184, or
an half, contracted the fever, which proved fatal to 45, or about 25
. In the Marine Hospital at Quebec, every old nurse, as I was
by Dr. Morrin, experienced an attack. This extension of the dis-
others than the immigrants, was generally admitted as evidence of
giousness. It is so regarded by Dr. Douglas, and also by Professor
, who has, moreover, mentioned several specific examples of the
ving been contracted by visiting ships and sheds. Without denying

immersed in an idio-miasmatic atmosphere not less than a contagious one if the latter existed; for the patients in the sheds were unavoidably crowded together, and, in general, when I passed through them, seemed to be lying in the very clothes they had worn across the sea. The same gentleman informs us that a female immigrant introduced the disease into a family by calling on one of its members, but as she did not labor under the disease herself, it must have been an exhalation from her clothing which did the mischief, and who could say whether the agent previously imbibed, and then given out was contagion or a miasm. But while I object to this mode of settling the question, I must state that facts of a different kind show conclusively that cases of the fever were propagated by contagion. Thus I was assured at various places on the St. Lawrence, that immigrants had communicated the disease to individuals in the country, and they had given it to others who waited upon them; in which latter case it would be nothing but contagion which did the mischief.

In Montreal, I was assured by Drs. Holmes, M'Cullough, and Hall, that the fever had spread among the poor people of that city from boarding-houses in which immigrants had sickened, and whence they had been removed to the hospital-sheds; and Dr. Badgley mentions the case of a wife, who contracted the fever from nursing her husband, who had caught the disease in the sheds. But a more conclusive observation has been communicated to me by Dr. Gilbert. The town of Hatley, in the eastern townships of Lower Canada,* lies nearly one hundred miles from the St. Lawrence, in an elevated and healthy region. Continued fever is so rare, that in five years practice, over a district containing 5,000 inhabitants, Dr. Gilbert had seen only five sporadic cases. In the month of July, 1847, two men visited Montreal, and were led by curiosity into the sheds of the Irish immigrants confined with the fever. Immediately after their return home, they were both taken down with the fever; and during the next two months, Dr. Gilbert had sixteen cases which could be distinctly traced, directly or indirectly, to these two; for they occurred, in every instance, in persons who had watched all night with those sick with the fever. In the month of October, another citizen of Hatley visited Montreal, and exposed himself to the atmosphere of the sick. Immediately after reaching home, he was taken down with the fever, and to him Dr. Gilbert was able afterwards to trace up six cases. The fever subsequently spread over the country; and Dr. Gilbert saw six patients in an adjoining township, in consultation, and recognized their fever as the same which had affected those who contracted the disease in Montreal.

Although contagious propagation is thus established, the general history of this exotic epidemic clearly indicates, that the contagion was neither abundant nor virulent. Thus Dr. Douglas admits that, when cleanliness and ventilation were duly attended to, and there was but a single patient

* See vol. i. p. 421-22, Nos. III. and IV.

it proved fatal to two of them. One of the three had ten chil-
d lay in their midst; but none of them sickened. Prof. Holmes
me that such cases were numerous; but he believed they were
to families who lived in comfortable circumstances; and in this
it, Drs. M'Cullough, Hall, and Badgley concurred. Finally,
very town and village on either bank of the St. Lawrence, had sick
nts in it, and an energetic contagion could scarcely have failed to
a general prevalence of the fever among the resident population,
owever did not happen. These observations, I think, express the
ice of the towns along the Erie Canal and the Mississippi River,
than the St. Lawrence; and encourage us to hope, that the native
on of our Valley will not suffer to any serious degree by this
tion of continued fever.

SYMPTOMATIC CHARACTERS.—As an introduction to the symptoma-
of this fever, we may recognize two important facts. *First.* The
generally were the poorer, most of them the very poorest of the
f Ireland. Persons who had been born and reared in the midst of
dged in unventilated hovels, imperfectly warmed in autumn, winter,
ing; inadequately clothed, and insufficiently nourished. Many of
moreover, had been given to alcoholic intemperance. *Second.* In
s 1846 and 1847 they had been subjected to a famine, under which
les of the people of Ireland had perished, and from which those
aped to Canada had suffered severely. Their appearance at Grosse
lebec, and Montreal, was in general emaciated, feeble, haggard,
orn. Men and women of stout frame had often lost all energy of
on, and many children had the physiognomy of lean and anxious old
. fever in such subjects must necessarily differ widely in many of its
ms from the same disease occurring in the native, well fed, clothed,
nd population of the Interior Valley. In such a population the

grappled with it; but their publications have taken a different direction and I am thrown back on the brief notice of the symptoms, which partly from rapid observation and partly from conversation with a large number of physicians, I compiled and published in the journals at that time.

"Most of the cases are not seen in the beginning by physicians, and no reliable accounts can be got of them; but on the whole, the majority seem to sicken gradually; and in reference to those who had been greatly reduced by famine, this is perhaps always the case. There are, however, many examples of sudden and violent invasion, followed by a malignant development, and death in a few days. In no instance does the chill become very intense, though it may be protracted, nor is the arterial reaction very high. In some cases the latter, in fact, never manifests itself—the vital force being inadequate to a rally. The pulse is never tense, and in the highest reaction always easily compressible; its frequency is increased, but not to a remarkable degree; it often becomes almost imperceptible in those who recover. From the beginning, the primæ viæ are more or less, but variously disordered. In some there is nausea and vomiting; in all, loss of appetite, with thirst. Some are costive in the forming stage, and even throughout the fever; in others there is a *precursory* diarrhœa; in the majority, a *supervening* diarrhœa or actual dysentery. I could not ascertain that there is generally a superabundant excretion of bile. The tongue at the onset is always covered with white fur, through which the red papillæ sometimes show themselves; in a part, the edges and tip of the organ show some unnatural redness, but in the greater number the natural color is not exalted, but even reduced, so that the white fur seems to shoot out of a pallid membrane. At the same time the organ becomes broader and flatter, loses its elasticity, and receives indentations from the teeth, on which I seldom saw any sordes. Its moisture continues in a remarkable degree; it may be reduced, but not to the point of dryness; and the whiteness of the fur endures to a period equally late. The dry, contracted, mahogany tongue of genuine typhus often appears, it is true; but in numerous instances the moist and pale state of the organ continues up to the time of dissolution. The usual inequality of heat between the upper and lower parts of the body is common. I saw many patients in which the latter were cold, and some in which the former were decidedly hot; but great development of caloric is not, I think, a constant phenomenon. Delirium is more prevalent than coma; many patients during the night, when it is greatest, are restless and even locomotive, becoming the next day composed and of sound mind. Somnolency did not appear to me to be a conspicuous symptom. Headache is often present. Of the red and dull eye, I saw much less than I had expected. A circumscribed flush of the cheek is frequent, but not universal. A bilious tinge of the visage occasionally shows itself. Subsultus tendinum is comparatively rare. I saw many who seemed to be in *articulo mortis*, and yet showed little or none of that symptom.

not quite so frequent; nevertheless all the medical gentlemen
cases of well-marked purpura hemorrhagica mixed up with the
s; and it may be safely affirmed that in these immigrants the
ler the influence of a reduced, or unhealthy diet, has become
leteriorated.

1 the fever assumes a protracted form, anasarcous infiltrations into
ar tissue of the lower extremities, or the face, frequently take
uppurations, in addition to those of the skin just mentioned, are
Those about the back and hips may be ascribed to pressure; but
curring in glands, must be referred to the fever. Of these organs,
ds suffer oftener than all the rest, and the discharge of pus when
urate is copious. Such cases generally end well.

ervening bronchial or pulmonary affection is, on the other hand,
and as it frequently occurs, may be considered one of the modes
the fever comes to a fatal termination.

f all the secondary affections, that of the bowels is most frequent
, though death may not occur for a considerable time after the
riod has expired. This intestinal disorder seems to be a sort of
diarrhœa and dysentery, under which the patient loses the origi-
symptoms, and becoming extremely emaciated, gradually sinks.
nstances, the affection sets in during the fever; in others it is ex-
he period of convalescence by irregularities of diet; in all it is an
tinate, and unmanageable *addendum*. In the months of June and
as much less frequent than at the present time, when so large a
1 of the patients labor under it as almost to constitute it a new act
lancholy drama.

...ser obscure. In every ward that I visited, I ... amount of visible manifestation of dangerous ... prompted to say to the medical gentlemen, ... your patients die.' In wards from which ...ried out, there would be but few who did not ...their moist tongues with facility, and make ...any such patients die soon afterwards; others die ... pronounced them convalescent; others after they ...themselves, and crawled into the open air. Such ...ed as the effect of any particular organic lesion, but ... or collapse, bearing some resemblance to the third ... the recurring chill of a malignant intermittent in ... perhaps, to the fatal stage of epidemic cholera."

...mind, that this brief and desultory sketch is not a ...as it appeared in the people of Canada, *but in the immi-* ...gration which it underwent in the well-fed and vigor- ... the Colony. I am not prepared to speak.

...had an attack of the fever in 1836, and although exposed ...year up to 1847, had escaped a second; but when he had ... the concentrated foul air of ships, or crowded hospital ... weather was calm and sultry, he suffered from "derange- ...vils, lassitude, and nausea." On the whole, he thinks an ...appears to bestow an immunity for several years. Prof. ...avert this conclusion, and affirms that relapses and ...at more distant periods are common.

...AL ANATOMY.—Dr. Fraser* gives the following, as the ... examinations in the Montreal General Hospital:— ...appearances found on dissection are venous congestion, ...sirum on the surface, in the ventricles, and base of the ...of active inflammation. When the case has been com- ...hours, I have found the bronchial mucous membrane ...swollen, highly vascular, and containing much mucus; ...extending to the submucous tissue, with congestion and par- ...of portions of the lungs. When diarrhœa has existed, ...especially the lower portion of the ileum, has presented ...of active congestion of its mucous coat, which was slightly ...being softened; some patches had the appearance of ...extravasation, not unlike the maculæ observed on the skin. ...had a jaundiced appearance, a common occurrence in this ...I have found the liver enlarged from congestion, presenting a ...and bilious appearance when cut into, and the gall-bladder distended ...inspissated bile, thick enough to maintain its form when deprived of ...covering. When there has been only a slight bilious tinge of the skin

* Brit. Amer. Jour. vol. iii. p. 61.

ictivæ, the liver presented the same appearance in a less degree, the gall-bladder being about the consistence of treacle."
proportion of the patients attended by Dr. Fraser had maculæ, nd bronchial congestion. Those which he examined after death, ve been citizens of Montreal.
igley* made twelve *post-mortem* inspections in the same Hos- iis patients, like those of Dr. Fraser, do not appear to have been i. The following is an abridged statement of what he saw.
irk purple petechial spots which existed on various portions of efore death, remained distinct."

* * * * * * *

viding the integuments of the head, a large quantity of dark- od always escaped; there was invariably a strong attachment e calvarium and dura mater, ecchymosed spots on various por- of different sizes. On removing the former, the sinuses, and the lateral and torcular Herophili, were full of, and prominent ar dark-colored blood. On removing the dura mater, effusions e pia mater and arachnoid were visible, occupying spaces of from f an inch to an inch of surface, the arachnoid sensibly elevated ection; on slitting open these sacs, a thin and clear watery fluid ere was *no appearance of lymph, nor of pus.* The brain proper good consistence; the cerebellum was always rather softened; of the hemispheres presented a universal network of dark red ie pia mater was easily detached from the brain surface; bloody abundantly exposed to view with every section of the brain- the great commissures, and indeed the white or central medullary nerally, were, if anything, slightly softened; the lateral ventri- ned from one to three drachms of limpid fluid—sometimes this o be a little discolored; some of the same fluid was always found ie arachnoid surfaces, at the base of the brain; in two cases, upwards of ten drachms; in all, the cineritious portions of the is, thalami, corpora striata, and arbor vitæ were palpably darker an usual, while the choroid plexuses in the lateral ventricles were l resembled in color the gills of a fish many hours out of water. the body, fluid, variable in quantity, always flowed out of the anal."

* * * * * * *

ening the thorax, in the majority of the cases examined, no trace pleural inflammation was detected in them; there were old adhe- ing between the pleural surfaces on the right side; in several there s of the upper and the thin margin of the middle lobes; fluid, quantity, was found at the base of the thoracic cone, on both l, but no flocculi of lymph; extensive congestion presented itself

* Brit. Amer. Jour. vol. iv. p. 88.

in the lungs of all, and to a striking degree, as was anticipated, in the inferior and posterior portions; the bronchi contained more or less frothy mucus, sometimes partially tinctured of a reddish color. The bronchial mucous membrane was in these cases full and swollen; the sub-mucous cellular tissue also infiltrated, especially towards the back part of the lung; there was no abrasion nor softening of the former; nor was there false adventitious membrane upon it. I never met with genuine hepatization of the lung, the solidifications appearing to be only the result of serous exhalation, consequent upon the congestion of the parenchyma; for on compressing these portions, a considerable quantity of the contained fluids could be forced out without breaking down their structure."

* * * * * * * *

"In all the cases, the heart was soft and flabby, resembling, in consistence, a mass of dough. Its size was natural, but wanting its nourishment, it impressed one with the idea of its volume being diminished. The pericardium contained in all a variable quantity of fluid, generally slightly reddish, without lymph or adhesions; the inner membrane was smooth, having a roseate color; the same thing was observed as to the endocardium; in all the cavities, auricles as well as ventricles, there were masses of blood, very soft, of a yellow color, caught sometimes between the musculi pectinati, or the chordæ tendineæ, and the loose edges of the valves."

* * * * * * * *

"The lining membrane of the aorta and its branches, was infiltrated; the blood contained in them was invariably fluid, dark-colored, giving off a peculiar odor."

* * * * * * * *

"I hazard the idea that the ammoniacal odor emanating from the living body, so strong on opening the large cavities and so striking on receiving some of the blood out of the vessels, arteries as well as veins, into the hand, were all due to the same condition of this fluid; the actual presence of ammoniacal salts, one of the surest proofs of the putrescent condition of the vital fluid; in fact, to speak paradoxically, of the *existence of death during life.*"

* * * * * * * *

"On turning over the abdominal flaps, no appearance of recent inflammation or any of its results were visible as regarded the peritoneum, except in the case of the young woman already adverted to, and who aborted between the fourth and fifth month."

* * * * * * * *

"There was more or less fluid found in the depending part of the peritoneal sac in every case, and the investing portion of this over the intestines and other abdominal organs communicated to the fingers an extraordinary aponaceous feel; the mesenteric glands were enlarged in several of the cases, presenting a darkish, yellow-colored matter, easily broken down; there was

...r the biliary ducts; there was nothing abnormal in the pancreas; ach and intestines all presented great congestion, both externally rnally; they all contained a large quantity of fluid and pultaceous f a yellowish color, acid and persistent odor. In only one case did re a thickening of the coats of the former, and in this one only did r anything approaching to a softening or separability of the mucous ich, from its loosening in pretty large flakes, I attributed to soften- ie submucous cellular tissue. Ecchymoses of the depending intes- re generally noticed, and in most of the cases, isolated patches of tion, of sizes from a quarter of an inch, to three or four inches, and ise, to the extent of upwards of eight inches, which were visible on esponding mucous surfaces, were seen. I did not find a single case ation of the glands of this tube; all the glands, both solitary and e, were enlarged, sometimes irregular in their form, with a dark r blackish point or nucleus in their centre; sometimes merely ele- ove the surface, thoroughly congested or hemorrhagic."

at Grosse Isle, I was told that the occupation of the physician was , as to leave no time for *post-mortem* inspections, a truth that was at a single glance. In the immigrant hospital of Montreal, such tions were prevented, according to Dr. Badgley, by popular pre-

TREATMENT.—The conviction of all the medical gentlemen with conversed was, that after the fever had become established, no of treatment could shorten it. Yet cases terminated at every point from two or three days up to as many or twice as many weeks. The minations were generally in death. The following outline, from of Dr. Douglas, gives the method pursued at Grosse Isle, where,

gave up their use, from a conviction of their utter inefficacy. Cleanliness, quietness, cool drinks, gentle aperients of calomel and rhubarb, or senna and salts, so as to produce two or three stools in the twenty-four hours, with three half pints of gruel or arrowroot per diem for diet, were the chief means resorted to during the progress of the fever. If head symptoms showed themselves, the *douche* was used, and a single fold of linen cloth wet with cold water was kept applied to the shaved scalp. If there still existed great restlessness and insomnia notwithstanding these applications, recourse was had to hyoscyamus, as long experience has taught me that delirium, coma, and death often ensued, where attention to the important point of obtaining sleep is neglected. Stimulants were rarely employed in the early stage of the disease; towards the close, and when the struggle came, brandy and wine were freely used, and when these failed to rouse the sinking powers, great benefit was often derived from the administration of large doses of gum-camphor; doses of twenty to thirty grains three times in the twenty-four hours were given, in substance, reduced to a powder by means of a drop or two of spirits of wine. I have witnessed the most astonishing effects from the use of this drug in cases where there was almost total insensibility, a thread-like pulse, and complete loss of muscular power, as evinced by the sliding down in the bed. In such cases reaction has been brought on, and the flagging powers recalled by it, even when wine and brandy by the half pint had failed to stimulate. Tartar emetic was used with benefit where the disease showed itself in the chest.

"In the abdominal affection, where there was much purging, starch enemata with laudanum were administered, and a rag wet with turpentine was applied externally. This form of the disease was always the most troublesome and unmanageable, frequently baffling all the curative means employed. *Alum*, the *mineral acids* combined with opium, chalk with and without opium, and the whole catalogue of astringents, were tried by the young medical men, fresh from the schools, and having great faith in drugs. I did not find one who was not disgusted, sooner or later, with his pet remedy."

The treatment at other places was substantially the same as this. However, in Montreal, Professor Badgley* and some of his friends, under certain theoretical views (which, not making a part of the natural history of the fever, I do not present), was led to place his chief reliance on the internal use of nitric, or nitro-hydrochloric (nitro-muriatic acid), with the early and liberal use of food. He sometimes gave a mustard emetic; and very seldom cathartics. When constipation rendered the latter indispensable, he preferred the compound tincture of senna. "Diaphoretics and febrifuges were not even thought of." In conversation, Dr. Badgley gave me the following formula, as that which he had found most efficacious:—

* Brit. Amer. Jour. vol. iv. p. 173.

this mixture a kind of extemporaneous "sweet spirit of nitre," and
e recollect how long that familiar medicine has maintained its popu-
the treatment of fevers of various kinds, we may the more readily
Dr. Badgley what he claims for his prescription, when he states
and two of his colleagues had, in private practice, treated more than
ere cases of the fever, without a single death. His patients, how-
ere not immigrants.

CHAPTER IX.

ETIOLOGICAL GENERALIZATIONS.

INTRODUCTION.

he preceding chapters, I have presented, with as much brevity as
, a history of the principal visitations of continued fever which our
Valley has suffered. I propose now to generalize the facts which
body, and incorporate with them such additional observations fur-
by other countries, as may supply deficiencies, and assist in establish-
ect general conclusions. The foreign will thus be engrafted on the
tock, not substituted for it; the particular will become a part of the
, but still preserve so much of its individuality as to be distinguish-
his continued recognition of our *own* facts is obviously an important
or they are to be relied upon; not because they have been more
y observed and recorded, for such is not the case, but because they
ith absolute certainty to our own diseases, while those of distant

SECTION I.

CLIMATIC RELATIONS.

I. CONNECTION WITH MEAN ANNUAL TEMPERATURE.—Most of the epidemics and subepidemics of which notices have been given, have occurred in the middle latitudes of the settled portions of the Valley, that is, between the thirty-third and forty-third parallels. Are we to conclude, then, that these latitudes are most favorable to the production of typhous fevers? Such would be the conclusion if we had no other data to reason from; but there are such, and to these we must give attention. From the Army Returns of the United States and Great Britain, I have constructed the following table, exhibiting, in connection with autumnal or periodical fever, the comparative prevalence of those typhous fevers which are recorded as "typhus" through twenty-three degrees of latitude, from Key West to Quebec. The table also gives the prevalence of a fever denominated "synochal" in the American Returns, and "synochus" in the British. This fever I regard as specifically the same with "typhus," the reasons for which opinion will be given in a subsequent chapter; the two are therefore combined in a separate or third column.

ZONES OF MILITARY POSTS.	Intermittent.	Remittent.	Total Autumnal.	Synochus.	Typhus.	Total Continued.	Common Con. Fever.
I. Marine: Subtropical: six posts, from Key West to Fort Pike; N. L. 24° 30′ to 30° 30′,	595	151	746	29	1	30	
II. Southern Inland: six posts, from Baton Rouge to Fort Gibson; N. L. 30° 30′, to 36° 30′,	700	169	869	11	2	13	
III. Northern Inland: six posts from Jefferson Barracks to Fort Snelling; N. L. 36° 30′ to 45°,	239	59	298	8	1	9	
IV. Lacustrine: seven posts, from Fort Dearborn to Fort Brady; N. L. 41° to 47°,	237	34	271	21	5	26	
V. Lacustrine: Canada West; from N. L. 42° to 45°; period of ten years,	178	12	190	5	0	5	80
VI. Northeastern Inland: Canada East; from N. L. 45° to 48°; period of ten years,	26	1	27	7	0	7	131
VII. The Canadas united: period of twenty years,	79	5	84	5	1	6	129
VIII. Maximum station of each of the first four zones: synochus and typhus:—							
1. New Orleans,				96	3	99	
2. Fort Smith,				23	0	23	
3. Fort Armstrong,				18	0	18	
4. Fort Niagara,				60	3	63	

By this table we see, that, with two exceptions, the amount of typhous fevers in the different zones is nearly the same throughout the whole. The exceptions do not arise from a greater general prevalence of the fever over the whole of the two zones, I. and IV. as exhibited in the table, but from

Yet, this conclusion, although a legitimate deduction from the
cannot be correct; and this brings us to study the bearing of the
in the seventh column of the table, which represents what are
ommon continued fevers," in the British reports. These numbers
great prevalence in the Canadas, especially in Lower Canada, of
of fever; while it is not even named in the American reports.
shall be said of this "common continued fever," standing side
ith "synochus" and "typhus?" I am disposed to believe it an
e of different febrile affections. 1. Cases of synochus not strongly
2. Of disguised phlegmasiæ; 3. Of autumnal remittent fever,
a sub-continued type; 4. Of mere ephemeræ. When, however,
turally deduct the three latter classes, enough will no doubt still
justify the conclusion, that in Lower Canada continued fevers of
is type, are in reality more prevalent, sporadically if not epidemi-
a in the regions farther south.

se fevers do not continue to increase as we advance into colder
and I have little doubt that they diminish beyond Montreal, or
arallel of latitude. Beyond that parallel, except on the banks of
awrence, the inhabitants are too few to justify a positive conclu-
t the southwestern coasts of Hudson's Bay, the shores of Lake
, and the regions between them and the Rocky Mountains from
ighth to the fifty-eighth degree of latitude, have many fur-trading
ents, in none of which do continued fevers appear to have prevailed.
ervations have been made in higher latitudes, with the same negative
Thus Captain Parry spent two winters near the line which separates
rate from the polar zone, and one far within the latter, and Captain
t four successive winters in a harbor intermediate to the other two,
o typhous fevers occurred in their crews, although for a great part
ime they subsisted on a meagre diet, and inhabited close and

of that region, does not mention continued fever; and Wrangell and Erman, in their journeys through Siberia nearly a century afterwards, are equally silent in reference to it. We are certain, then, that continued or typhous fever is limited by climate to the north as well as to the south.

In our Interior Valley, continued fevers have their chief prevalence between the 32d and 48th parallels. In Western Europe between the 44th and 60th. Where the mean annual temperature rises above 62° or falls below 40° they prevail but little on either continent. The isothermal curves which best represent them in Western Europe are 48°–52°. In this country they have not prevailed sufficiently to justify a conclusion on this point.

II. Relation to the Seasons.—For the study of our continued fevers in their relation to the seasons, the facts are not as full and precise as could be desired; yet some approximation to the truth may be made. If we bring together the chronological data afforded by the foregoing histories, and connect with them the prevalence of continued fever, we have twenty-six sub-epidemics, which bear the following relation to the seasons: *Begun* to prevail, in winter, eight; in spring, three; in summer, three; in autumn, seven; not stated, five. *Prevailing* in winter, twenty-two; in spring, twelve; in summer, eleven; in autumn, eighteen. *Ceased* in winter, but recurred the ensuing summer, three; *ceased* in summer, but returned the following winter, two. We should be cautious in drawing conclusions from such limited and doubtful premises, yet the following seem warrantable. First, that our continued fevers make their appearance in every season, but begin more than twice as often in fall and winter, than in spring and summer. Second, that they prevail much oftener in autumn and winter, than in the other seasons, and most frequently of all in winter. Third, that they sometimes cease with the access of summer, reviving in winter, again to cease when summer returns; and that the same remark is conversely true of winter. On the whole, they prevail more in cold than in warm weather, and this coincides with my own observations at Cincinnati, where the number of sporadic cases has generally been greater between the autumnal and vernal equinoxes, than in the other half of the year. The frequency of the commencement of these fevers late in autumn, compared with spring and summer, results, in all probability, from a union of their cause with that of autumnal fever in October and November.

When we refer to the British and Irish histories of continued fevers, we find that on the point now under discussion, they obey the same law. At different times and places, they have commenced, reigned, and ceased, in every season of the year. Thus in relation to the seasons, they differ widely from periodical fevers.

III. Influence of the Annual Range of Temperature.—We must now inquire into the influence of winter and summer *extremes* of temperature on the prevalence of continued fever. For this purpose we may use

. London, and burgh, ...	49°	39°	60°	21°

this table, it appears that the difference between the mean heat of
ıd summer, in this valley, is equal to four-fifths of the mean tempe-
f the year; on the continent of Europe, to three-fifths; on the
f Great Britain and Ireland, to two-fifths; or, to vary the expres-
range from winter to summer is about twice as great in this valley
se islands, while the continent of Europe holds a middle place be-
e two.

hat is the comparative prevalence of the continued fevers in these
regions? The answer is not difficult. It is inversely to the range
and summer heat, being least in the Interior Valley, greater on the
ınd intermediate on the continent of Europe. It is interesting to
this climatic law of continued fever with those of yellow fever and
l fever. A mean summer temperature of 80° or above, with a
mperature of 65° or upwards, is necessary to the prevalence of
ver in our valley; and an average summer heat of 60° or more,
yearly heat of 40° or upwards, is necessary to the production of
l fever. Thus, as a general law, yellow and autumnal fever are in
oportion to the heat of summer, while the continued fevers are in
roportion. Yet there is one point of view under which they con-
the same law. They all prevail most where the range between
ıd summer is least. Thus at St. Louis, the range is 42°, and yellow
ınknown; at Natchez, it is 29°, and the fever prevails occasionally;
ıa, only 10°, and there the yellow fever is as constantly present as
ever in Dublin. In the latitude represented by Cincinnati, the
40°, and the prevalence of autumnal fever is moderate. In that
ted by Baton Rouge, the range is 28°, and the fever prevails every

of another meteorological fact, viz., that where the range between winter and summer is small, the diurnal range is correspondingly small. Thus in these islands it is much less than in the zone of the Interior Valley with which we are comparing them. Now sudden and violent changes and extremes of atmospheric heat tend directly and powerfully to generate a phlogistic diathesis, which favors the production of phlegmasial diseases, but not of typhous fevers. Such a diathesis, may, indeed, be regarded as a preventive of those fevers. But the moderate cold and heat of the British Isles may act indirectly by favoring atmospheric humidity, and to that we must now give attention.

IV. Relations with Humidity.—Our continued fevers have not yet been studied in connection with the dew-point; but if we assume that it is high, in proportion to the contiguity of water and the elevation of temperature, we are compelled to say, that such a state of the atmosphere does not contribute, in the Interior Valley, to their production; for the shores of the northern lakes and the banks of our rivers have been least affected. On the contrary, the fevers have prevailed most where there was but little water to be evaporated. On the other hand, those European countries in which they prevail to the greatest extent, have a humid atmosphere; as every wind, except those from east to south (not of frequent occurrence), necessarily brings moisture from the Atlantic Ocean, the German Sea, the Baltic Sea, and the chain of lakes to its northeast, Ireland, England, and Scotland, being most exposed to this influence; and from the great prevalence of westerly winds, Ireland especially. Some of the enlightened medical historians of those islands have sought for a connection between these fevers and the quantity of rain; but the latter is not a measure of the humidity of the air, which can only be ascertained by experiments on the dew-point.

That it is at all times very great, is generally admitted. The absence of extreme cold in winter and of high heat in summer, recognised under the last head, contributes to the same result; for intense cold precipitates the vapor of the air, and extreme heat raises it far above the point of saturation, and makes it to our sensations dry, when its absolute quantity of vapor may be great. Dr. Fergusson* has laid much stress on the "moist-cold" of those countries, as a cause of their fevers; and, *e converso*, we may assume, that the dry-cold of our Valley is a cause of their comparative infrequency. In Great Britain and Ireland, the moist-cold is increased by deficiency of fuel; a deficiency which is but little felt, even by the very poorest classes, in this country. The shortness of spring with us deserves also a notice in this connection. If the fuel of our poor be exhausted by the end of winter, they soon bask in a sun as hot as that of midsummer in Ireland or England; but the poor of those countries are exposed, without the benefit of culinary fire, to many weeks of cool and damp weather, which may be even worse

* Edin. Med. and Surg. Journal.

than the atmosphere of their crowded huts in winter, notwithstanding they are then but imperfectly warmed.

Of the immediate pathological effects of such exposure it is not possible to speak with certainty; but we may conjecture that the solids are thereby enfeebled, the functions of the skin and liver impaired, and a deteriorated condition of the blood generated; but this inquiry must be reserved for a subsequent head.

SECTION II.

TOPOGRAPHICAL RELATIONS.

NOTWITHSTANDING what was said in the preceding section of the influence of a cold and humid atmosphere in the production of continued fevers in England and Ireland, it must be stated, that most of our subepidemics and sporadic cases of typhous fever, have occurred on rolling or mountainous surfaces, and not on the banks of the larger rivers or the coasts of the northern lakes. It may not be easy to explain this discrepancy; but in reference to the mountains I may remark, that the inhabitants generally occupy their valleys, and that the contiguous peaks and ranges, rising from one to two thousand feet above them, act as coolers, and condense the ascending vapor not less than that which arrives from a distance, thereby imparting to the air a considerable degree of humidity. These remarks, however, are not applicable to the zone of hilly or broken country, which, gradually sinking and becoming more level, stretches from the Apalachian mountains to the Mississippi; the sub-alpine side of which is at least as obnoxious to continued fevers as the mountains themselves, and far more subject than the portions which lie nearer that river. The mineral character of the subjacent rocks affords no explanation; for where it is the same, as for example, within the Pennsylvania and the Illinois coal basin, the prevalence of typhous fevers is very different. We must, then, refer to the organic matters which rest upon or mingle with the soil. In the mountainous and hilly regions, these are washed away by the rains to be transported and deposited in the lower valleys. Now, those portions of the country *from* which this transportation is made are most infested with continued fevers; those *to* which it is made are least infested; the reverse of which is true of the periodical fevers. Hence, to the east of a median line, drawn parallel to the mountains and the Mississippi, the people suffer but little from periodical fevers—to the west as little from those of a continued type.

Here, then, is a species of antagonism, which suggests that the conditions favorable to the production of the former, tend to prevent the latter. And this brings me to say, that our Army statistics embodied in the table, p. 442, do not correctly represent the amount of continued fever in the *latitudes* of

the different posts, but only at the posts themselves, which are generally situated in alluvial, and, so called, malarial localities.

All this is sustained by a reference to the British reports. Both continued and periodical fevers prevail in Canada West. The flat, fertile and wet surface of that region generates the latter; while the low temperature favors the production of the former. Thus the influences are combined, and Dr. Stratton, as we have already seen, has described a part of these cases under the designation of "continued malarial fever." When we advance into Canada East, we reach a still colder climate, with a much more sterile soil, and a nearer proximity of mountains, and there periodical fevers, especially intermittents, nearly cease—are replaced by continued fevers. The difference between the two Canadas in reference to intermittent fever, is, according to the table, as 178 to 26; and yet these numbers do not show the whole, for it is well known that many cases of intermittent fever occurring in Canada East were contracted in Canada West. The allowance to be made for this is estimated by Major Tullock, the British editor, at 10 per cent.; so that 180 to 24 would more nearly express the actual relation. On the other hand, the relation between the continued fevers of the two provinces is expressed by 90 and 131; but as many cases were contracted in Lower, and began in Upper Canada, we should subtract 9 from the former number, and add it to the latter, when we obtain as a true expression 81 and 140, or three times as many cases of continued fever in the colder or more barren province as in the other. Thus it seems to be true of the whole Interior Valley that the cause of periodical fevers is antagonistic to that of the continued.

We may now turn to the effects of clearing and cultivation. Although sporadic cases of continued fever have occurred from the beginning of immigration into those parts of the Interior Valley which are still infested by that disease, it is undeniable that cultivation has diminished the amount of periodical, and increased that of continued fever.

When we look to the degree in which the forest has been replaced by the products of agriculture, and especially to the length of time the soil has been tilled, we find that where these labors have been longest performed the continued fevers are *cæteris paribus* most prevalent. This is the case in the western part of Pennsylvania, and adjacent parts of Ohio; in the neighborhood of Cincinnati, in the middle and northern parts of Kentucky, in Middle Tennessee, and above all in Lower Canada, the dates of the first settlements in which places (a necessary element of medical history), may be found under the appropriate heads in Book I. Part I. The comparatively very early settlement of the lands along the estuary of the St. Lawrence, is probably one of the greatest causes of the remarkable prevalence of continued fever, and of that abatement or disappearance of periodical fevers, which has taken place more or less within the memory of the present gene-

of the latter. Perhaps it operates in both modes. When we com-
i age of European settlements with those of America, we doubtless
cause of the greater prevalence of continued fever, in the former—
lical, in the latter; and may foresee that time will bring forth a
n the type of our fevers.

owns and cities are the offsprings of old settlements, and these have
arded as especially favoring the production of continued fevers. It
appear, however, that such is the case in our Valley. I could not
at Quebec, the oldest city of the Valley, and in some of its parts
sely peopled, is more subject to continued fevers, than the open
and country around; and the same remark is applicable to Montreal.
g is less infested than the long-settled ridges south of the Monon-
liver; Wheeling less than the eastern end of Ohio, opposite to it,
cinnati has never experienced such an epidemic as occurred on the
g Walnut Hills. In fact most of the local epidemics and sub-epi-
f which I have been able to collect any accounts, have prevailed in
ntry and the villages; which is *not* the case in Europe, where on the
e cities suffer most.

SECTION III.

PHYSIOLOGICAL AND DOMESTIC INFLUENCES.

PHYSIOLOGICAL.—Continued fevers in this as in other countries, are
ttack the young rather than the aged. In the absence of statistics,
xpress the belief that a large majority of patients are under thirty
[illegible]

first, it cannot be affirmed that either class is more obnoxious to continued fever than another. But I am disposed to think that the fourth are more liable than the others. It is not uncommon to see Irish immigrants taken down with the disease many months after they have reached the interior of the Valley, and the reports of the British army in Canada, p. 442, give an account of cases so far beyond that of the United States army in the same latitudes, as to suggest a predisposition to continued fever in the royal troops. This may possibly consist in a national peculiarity of constitution, but more probably depends on impressions made on the system before leaving their native country. In support of this opinion, I may mention that a physician, name forgotten, of Lower Canada, informed me that where he lives he had never seen but three cases of intermittent fever, two of which occurred in individuals who had spent the preceding autumn further west, where it prevailed, but were not then attacked; and the other, ten years before, had resided in the western part of New York, where that fever was endemic.

II. DOMESTIC AND SOCIAL.—We never ascribe either yellow fever or our periodical fevers to domestic conditions; but in all the kingdoms of Europe, where continued fevers prevail, they are the fatal scourge of the poor, though extending more or less to those in comfortable circumstances. The evils of poverty in this country, not less than the proportion of poor, fall as far below what those kingdoms present, as the prevalence of typhous fevers here is below their prevalence in Europe. Thus corresponding observations in different regions which differ widely in their social and domestic condition, contribute to establish truth or expose error.

We have seen that our typhous fevers prevail rather more in the country than in the cities. The domestic condition under which the poor of the latter live, are much better than those to which they are subjected in Europe. Their dwellings are not in courts and closes, but generally stand full on the margin of the street, have uncovered yards in the rear, are often but one story high, and seldom more than two, not compactly jammed together, are better warmed in winter, are kept in a cleaner condition, and lodge fewer inmates, than the houses of the poor in Dublin, Glasgow, or Edinburgh. The rarity of the fever under these mitigated circumstances, harmonizes well with its greater prevalence where all of them are aggravated.

Poverty, in the Interior Valley, seldom brings the despondency and mental wretchedness which are its offspring in Europe. There is no lack of diversified occupation; large masses of those who depend on the labors of one day to furnish their families with food and fuel for the next, are never thrown out of employment, and if at any time, there is in the cities, a deficient demand, the open and thinly peopled country presents inexhaustible resources to the working man and his family. Our German, English, and Welsh immigrants are inclined to disperse themselves, and cultivate the soil; but the Irish are prone to congregate in the purlieus of the cities, where, at no distant time, under the rate of influx which has prevailed for several

ng diet. One exception deserves to be recalled. The students of
heological Seminary, near Cincinnati, left to decide on their diet,
ly abjured animal food, and many subsisted on bread and molasses,
articles of a like kind, at the same time repudiating tea and coffee.
abits were cleanly, and their lodgings not crowded. Now, the out-
fever in this little community, independently of known contagion,
the conclusion that deficient nourishment is one of its causes. In
thern epidemics, p. 415 and p. 375, the fever seemed to originate in
bins. These are often crowded at night, are seldom kept very clean,
more seldom well ventilated. How those negroes might have been
not be known, as every master does not come up to the standard
ublic opinion has established,—a much higher dietetic standard than
the poor in Europe. In the absence of a precise knowledge of the
tances under which the fever arose in these cases, we may fairly
that deficient diet was not of the number, and are thrown, therefore,
owded, filthy, and unventilated lodgings, if we do not admit the in-
on of contagion, of which there was no suspicion.

he whole, it may be affirmed, that in the Interior Valley, continued
ous fevers have repeatedly prevailed among those who were ade-
nourished with healthy food; but this does not prove that an
ent or insalubrious diet may not favor the production of these fevers.
l be more logical to say that the diet on which we live is one reason
y prevail so little; and that when they do arise, it is from other
which our full feeding cannot avert. One or more of the physicians
nd have expressed a doubt as to the influence of famine in the pro-
of these fevers; but the opposing testimony seems to be conclusive.
stimony will, to some extent, come before us in the next section;
tead of introducing it here, I will finish with a general remark
ed by the etiological inquiries through which we have passed.

first, it cannot be affirmed that ... securing for it the epithet ... than another. But I am disposed ... ured; though in a far less ... than the others. It is not unce... well known to possess active, ... the disease many months after ... deterioration of the potato ... and the reports of the Briti... it of a deleterious principle, ... cases so far beyond that of t... as indicating that the nitro... to suggest a predisposit... may perhaps undergo changes of ... may possibly consist in ... them injurious to health. ... bably depends on impre... ever is generally received as a fact. ... country. In support of ... the quantity of the articles just ... forgotten, of Lower ... and nutritive elements into hetero... seen but three cas... salubrity with scarcity, in the pro... viduals who had s... times of famine the worst articles of ... but were not th... they are the greatest sufferers from ... in the western ...

II. Domest... periodical f... where con... though ex... evils of p... far belo... here is ... in di... tion.

W... tha... lat... T... n...

CHAPTER X.

CONDITIONS CONTINUED: SPORADIC AND CONTAGIOUS PROPAGATION.

SECTION I.

... PRIMARY AND SECONDARY.

... with my brethren of the Interior Valley, I ... and sporadic typhous fever to doubt for a ... symptoms, progress, and duration, could ... typhous, may originate independently ... generating it. In one year, a single ... neighborhood, in another there may be several; ... justify the epithet subepidemic. Such ... Some of them can be traced up to a ... communications; but others appear under cir... which involve their origin in ...

... autumnal remittent fever instead of ... second week, or assuming an intermittent ... simulates an original typhous so closely ... between the two is impracticable. This ten... the lower latitudes, and much stronger ... It is common to ascribe it to improper treat...

more expect to see a case of synochus put on the aspect of
r, than a case of remittent autumnal fever. The eruptive fevers
ie phlegmasiæ now and then, display a typhous proclivity. It
that the word typhous, in a pathological sense, expresses a
ition of the system, which may be preceded by different febrile
ed by a great variety of remote causes; but this subject will
future head. I have never seen this secondary typhous propa-
ntagion. Many cases may occur in a single autumn, but they
dependently of each other as the remittent fever, which may be
eir pathological cause. We must not confound this state of
ver with that which is denominated malignant or congestive; for
ms, although in many cases equally portentous, are different, and
rmer appear oftenest in dry and elevated places, the latter are
hot, depressed, and paludal localities. There are, however,
ions to this remark.

SECTION II.

CONTAGIOUS PROPAGATION.

R ENDEMIC TYPHUS.—It has just been stated, that in various
Interior Valley, sporadic cases of typhous fever occur, which
eferred to contagion, and do not propagate themselves by it;
subepidemics which have been described, furnish strong evi-
e have also typhous fevers which do propagate themselves in
Without repeating the narratives, I may refer to the fevers
iled at the Sault St. Marie, near Lake Superior, p. 422; at
Pa., p. 381; at Parisburg, Va., p. 370; at Lane Theological
hio, p. 392; in Maury County, Tenn., p. 413; and in Benton

tinued fever barely admit the contagiousness of some of its forms, the physicians of Great Britain and Ireland, with almost perfect unanimity, speak of contagious propagation as a familiar and perfectly established fact. Many of them, indeed, prefer the word "contagious," when "typhus" alone would be more appropriate. The habitual and often indiscriminating use of that term, seems indeed to suggest that there is no typhous fever, which is not contagious—none which has not *arisen* from contagion. Various conditions are admitted as favoring the spread of typhous, but their influence it is said is limited to two effects: first, the retention and accumulation of contagion around the patient, whereby it acts upon the systems of those who approach him with greater energy; and, secondly, changes in the condition of their systems, which render them more vulnerable to the action of the *specific* and only cause. Those who hold to this exclusive origin, believe that the fever always exists, at least sporadically, in some part of the United Kingdom, but cannot generate an epidemic except when the conditions to which I have referred are present. According to these views, if those conditions could be permanently destroyed, epidemic typhous would cease; and, on the other hand, if the islands were once rid of every case of that fever, and of every substance which might have imbibed the contagion it is said to generate, and neither should afterwards be imported, the fever would not reappear—the conditions which favor an epidemic prevalence might remain, or even be multiplied or augmented indefinitely, but the fever would not reappear for want of a specific virus. I cannot adopt this opinion, nor is it held by a majority of the distinguished men who have observed and written on the subject.

In seeking for the proofs of an exclusive or even general spread of typhous by contagion, I have not found them either numerous or conclusive. One which seems to satisfy the minds of many of the historians of the United Kingdom, is the sometimes rapid extension of the fever when it appears in a city or other locality; but the opposite conclusion should be drawn from such a premise. Influenza, epidemic cholera, and yellow fever, non-contagious epidemics—often spread rapidly; but measles and small-pox, known to be contagious, spread more slowly. Another and (to those who admit it) more satisfactory evidence is the successive occurrence of single cases in the same family. So much stress has been laid on this, that very learned and eminent men have proposed to arrest the rise of an epidemic, by a timely removal of every patient from the house in which he was attacked to a fever hospital. Now who does not see, that this successive, and often slow, invasion of the different members of a family, is at variance with a rapid diffusion of the disease through a community; and thus the two arguments for exclusive contagion, invalidate if they do not nullify each other. But, is the succession of attacks, continued till the disease has run through a family, a conclusive argument in favor of contagion? It certainly is not. A contagious fever *might* so extend itself, but such extension does not *prove* it

contagious. For, first, when a case of small-pox or measles appears in a family, all its susceptible members are apt to contract the disease, not from each other successively but from the first patient. Second, in numerous instances it has been impossible to trace up the fever of the first patient to contagion; yet, that which was to be proved was assumed, and all the subsequent cases in the family were said to be derived from his. Third, if typhous could only arise from contagion, the inference would be correct; but the question on which the case is brought to bear is, whether it *may not* arise from *other* causes; and therefore, unless it were shown (by exclusion) that no other cause could exist, which cannot be done, those who believe in other causes, are at liberty to refer to them, as producing both the first and all the subsequent cases. Should it be objected, that if such (local or domestic) agencies originated the fever, it ought to have attacked all the members of the family at the same time, the obvious rejoinder is, that as they were all equally exposed to the atmosphere of the same patient, they should all have been seized at once, if he exhaled contagion. Under both hypotheses we must call to our aid the differences of susceptibility which result from age, sex, temperament, idiosyncrasy and exciting causes, without which we cannot even explain the successive attacks in the same family, of our endemio-epidemic dysentery or autumnal fever.

An evidence of contagion has been found in the continued prevalence of the fever in the neighborhood of the first case; but this only takes place, when the topographical, domestic, and social conditions are the same; and, consequently, if *they* could generate the first, they might produce the subsequent cases. Nearly connected with this, is the prevalence of the disease in one part of Dublin or Edinburgh, while other parts apparently in the same condition remain exempt; and its prevalence in one town, while another hard by continues healthy, as in the instance of Galway, where, in 1822, according to Dr. Graves, it prevailed for three months before it attacked the village of Claddagh on the opposite side of the river, although the intercourse between the two places was not interdicted.* Now all this is equally true and equally inexplicable, of epidemic cholera and yellow fever, which do not depend on contagion.

Another evidence of contagion has been found in the occasional occurrence of the fever in persons who lived under topographical and domestic circumstances the opposite of those in which the fever was epidemic. The cause, it has been said, could not have been generated there. But might it not have been carried or have diffused itself there, and excited the disease in some of the most susceptible? The advocates of a local epidemic origin can without difficulty reconcile such cases with their views; and being explicable on both hypotheses, they give no decided support to either. In our autumnal fever we often see the same phenomenon: many cases near the focus of (so called) malaria, and a few on the neighboring heights,

* Dublin Trans., vol. iv. p. 408.

tinued fever barely admit the contagiousness of so
cians of Great Britain and Ireland, with almost
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tions to which I have referred a
those conditions could be perm
cease; and, on the other hand,
that fever, and of every subst
it is said to generate, and n
would not reappear—the c
might remain, or even b
fever would not reappear
opinion, nor is it held
observed and written

In seeking for the
by contagion, I hav
which seems to sat
Kingdom, is the s
a city or other lo
such a premise.
gious epidemics
be contagious.
satisfactory e
family. S
nent men
moval o
hospital
sion of
sion o
exclu
the
a co
tag

Fever, &c., London, 1831.

of hospitals.
tions; external nuisances
internal cleanliness is pre-
l, and their foul clothing kept
ver typhous fever has been epi-
nts, apothecaries, superintendents,
ed with the fever, has been so great
mmunicated by the patients. Quebec,
inburgh, Glasgow, and many other cities,
of proof. If in a few fever establishments
n place, in a far greater number it has; and
e former is negative, while that afforded by the
should not, indeed, expect to witness contagious
fever hospital, for we have already seen that some
me cases of that fever, are not contagious. And this
two questions: first, is there a contagious and also a non-
ous, two specifically distinct diseases, often prevailing at the
in the same place, and so similar in their symptoms as to be
ed? or is the secretion of contagious effluvia an accidental or con-
pathological event, which is sometimes absent and sometimes pre-
the same fever? I state these questions without attempting in this
our inquiry to answer them.

SECTION III.

LOCAL OR SPONTANEOUS ORIGIN OF EPIDEMIC TYPHOUS.

HAVING shown that in both America and Europe cases of epidemic

which are free from the topographical conditions
we sometimes see those heights the chief seat
cause is assumed to be developed in some foul

But the doctrine of contagious propagation
class of facts, differing somewhat from those
Histories of local and insulated subepidemic
been published to substantiate it, and from
tability of their authors, the question might
final answer. My limits do not permit
nearly all that I have seen are obnoxious
fever seemed to depend on contagion,
local causes, which in the opinion of
profession, may originate it, independently
sophical logic must reject such observations
the question is settled by other
for a different purpose. Of this
Dr. Thomas Trotter,* and
M'Gregor, of an epidemic
fever by Dr. Graves, already
ter, of the fever at Tornau
favorable to health existed
the real and exclusive cause.

The contagionist, how
equivocal or ambiguous
seem to be altogether
to the point than the
tant and healthy ru
as narrated on p.
already narrated.
can be far mo
one thickly p
observation
among th
sometime
the retu

In la
ticular
one th
of D.
rien
two

illustrated
parts of the earth's
mushrooms, yet if a spot
animals in decay, those
they were said to be gene-
the previous deposition of
ated in particular localities
facts have shown that the mush-
in the air. They have sown
now they infer that *all* mush-
seems to be irresistible.
quickening into life the seeds
the unmanured, barren soil,
presents to us the *predisposition* to
who reside in certain localities,
those who live in a better way
one should affirm of a parti-
that it was so distant from any
protected, that although those
could not have had such
would his argument be met?
uniformity, and constancy of
clusive contagionist take the
other profession, "rule out
where contagion could not
system of any one affected?
He was required to prove
generalization to all cases of
should he be called upon to
the other side. It is for
clusive, and that there *are*
contagion. But how are they
are excluded by the force
multitudes in every great
as far as they or others
been? The task, it must

under the same or similar
rnative is presented to us of
ditions only, or that contagion
ifferent localities, and every one
re probable.
he result of observation, that the ema-
patient are made and spread so slowly,
of most limited extent; and that a mode-
ontagion that it can no longer produce the
is at variance with the rapid spread through
metimes exhibits to us. If we know the quantity
agent, and are shown certain phenomena, which
ht be ascribed to it, and their magnitude, and the time
re produced, are also made known to us, we can in
with great certainty, whether the assigned cause did or did
them. Thus if we found a man in deep narcotism, and were
had swallowed an ounce of laudanum, we should not hesitate
that as the cause; but if he had only swallowed a drop, we should
me other, on the ground that the malady was disproportionate to
minute dose.

our thinly peopled country we now and then meet with a case of
, under circumstances of social insulation, so perfect and protracted
balancing probabilities, we are compelled to think it more likely to
isen from local causes, than from contagion.

pidemic febrile constitutions have been generally admitted since the
Sydenham. Almost every physician has observed them; and modi-
practice to meet the requirements which they imposed. But how
h contaminations or meteorations of the atmosphere result from a
l contagion, so feeble in its properties, that ordinary ventilation and

asserts also that by their enervating influence on th
pose it to be acted on by contagion; thus he ma
conditio sine qua non for every *epidemic* prevalenc
tagion is held to be a *causa sine qua non* of th
fever. When the conditions are present without
anomaly by saying, contagion is absent; when
pagate themselves, he ascribes it to the absen
hypothesis, which assuredly has in it great
by a fact drawn from the science of botany
surface are so dry and sterile that they do
should be covered with the remains of pla
plants immediately appear upon it. Fo
rated by the decaying organic elements
seed, as certain etiologists say that fev
without the aid of contagion. But th
rooms bear seed, which is so light a
it, and cultivated these humble pla
rooms grow from seed, a generaliz

The *capacity* of such a manur
which chance to fall upon it, is
on which they may likewise fa
fever generated in the syste
which predisposition will no
in localities of a different
cular spot where mushroo
other where they were ku
plants might *generally*
an origin in *that par*
Undoubtedly by a ref
the laws of nature.
same ground, and, t
of court" all the hi
by possibility have
Most assuredly he
contagion; he di
the fever. This
prove its truth
that to show t
continued
to do this, i
of a severe
epidemic.
know, e

ers,
typhous
generating
character.
Kenning, Surgeon,
on a cruise off the
ntlemen in the cockpit
confined them but a few
the sailors was seized with
9th of August more than
ncing the characteristic symp-
petechiæ, hemorrhages, and
last week of August there were
character. From the beginning of
to separate those that were
Kenning believed that this
medical officer, Dr. Trotter,
in it, for there are no facts
in the beginning, and the
as they were attacked;
disease in any of the attend-
among the sailors where
cases were generated where
took place. It must be admitted,
absolutely conclusive,
exposed to contagion before
If that were not
epidemic from local causes.
the British Army, has given the
before us.† "The 88th
(Island of) Jersey, with
preceding their arrival in
healthy condition." The

† Thomas Trotter, M.D. Lond. 1797.

which and the
the fever
nervous
duced into
mstances are
agionist) says
assigns a variety
ever, the first case
he people, the second,
onfined in the venereal
their previous belief, the
, and did all they could to
men were attacked within
to me that the evidences of local

..S, a company of United States troops,
airy and comfortable barracks in the
ere they enjoyed good health. On the 1st
ight into the city, and crowded into a house
late half their number. It was close, damp,
f that month, three of them were taken down
y the 18th of December, 120 out of 166 were on
s and walls were then scoured with hot lye, and all
g subjected to the same process. The purification was
ed, after which, although the troops continued in the
er the expiration of the month, not a single new case oc-
t may be said that this fever was introduced from the city,
regretted that Professor Potter did not inform us whether it
prevailing in Baltimore. His silence may perhaps be taken as
that it was not; and the sudden arrest of the epidemic by purifi-
f the quarters seems to show that the origin of the fever was in
uses.*

t additional facts might be found by a more extended bibliothecal
n than I have the opportunity of making, I cannot of course know.
clusion from those which have been presented must be, I think, that
e, continued, or typhous fevers have arisen from local causes, inde-
dly of contagion. And here the question put at the close of the last
returns upon us—can such fevers, which have this origin, be distin-
by their symptoms from those which depend on contagion? Do
nstitute a distinct species? These questions cannot be answered in
sent stage of our inquiry.

* Memoir on Contagion, by Nath. Potter, M.D., Baltimore, 1818.

SECTION IV.

CONNECTION BETWEEN CONTAGION AND LOCAL ORIGIN.

I. In the preceding sections, two facts were established: first, that in some epidemic typhous fevers there is contagious propagation; second, that others originate from local or strictly domestic conditions independently of contagion. It is the duty of the etiologist to reconcile or explain away the apparent conflict of these facts. This may be done, or at least attempted, in two modes: first, by showing that there are in the general group of continued or typhous fevers two species, one always contagious, the other always non-contagious; second, by showing that a fever which originates in local causes may become contagious. The first of these theories will be examined when we reach the nosological classification of these maladies; and, therefore, I will only remark here, that all attempts to prove the existence of two species, distinguishable by the presence or absence of contagion, have hitherto failed. Let us, then, turn our attention to the second hypothesis.

In proceeding to this inquiry, we must bear in mind that the question is not whether the exhalations from the body of a patient, in continued fever, are sufficiently copious to render the air of his room offensive, and, in a general hygienic sense, to contribute to its unhealthiness; but whether he *exhales a peculiar poison*, capable of exciting in the healthy system, a fever of the *same kind* with that which had been produced in him by a cause or causes of a *different* sort. The question, in fact, is not one of *quantity* but *quality;* and may be illustrated in this wise. A person affected with *autumnal* fever may, by his fluid and gaseous excretions, render the atmosphere of his room impure and unpleasant, without producing in the systems of those around him the kind of disease under which he labors: another patient affected with a different malady, as, for example, measles, may add nothing to the sensible impurities of the air, and yet exhale into it a gaseous contagion that will generate the same specific form of disease in those who breathe it. The inquiry before us is, whether a case of typhus, not produced by contagion, can *thus* propagate itself? When a number of persons, either sick or well, are crowded into a close, confined, and dirty room, it is often said, they *generate contagion*. No language could be more inaccurate. They exhale precisely what they would throw off elsewhere, and simply contribute to the foulness of the air. What deleterious compounds, if any, may be formed by chemical action *in* such an atmosphere, we do not know; but the term *contagion* has no applicability to them. It is quite as common, and quite as incorrect, to say, that a foul atmosphere around a typhous patient will cause *him* to generate contagion. This loose and vague phraseology should be discarded. Contagion is not elaborated around, but within the body of the patient; and there is not the slightest evidence that the

m that all just conception of their distinctive properties and dif-
es of origination, have in many minds been lost.

us return to the true question, which is, whether a fever, origi-
n a miasm or malaria, elaborated in the atmosphere, can cause
n of contagion, and thus extend and perpetuate itself?

ion only can decide this question; but we may, analogically, use
tions which have been made on diseases universally admitted to
us, as, for example, small-pox. This fever has been so long and
observed to arise from contagion only, that we speak of that as
sal cause, yet in doing so, in urging the generalization to the
absurdum, we find a logical necessity for admitting that the
ad a different origin; and hence the proposition is so restricted
that every case, *except* the *first*, had another case as its antece-
se. When thus modified, the way is laid open for the admission
hous fever *may* originate independently of contagion, and yet
itself *by* contagion. Should this happen every year in every
the world, and should there, on the other hand, never have been
e originary case of small-pox, syphilis, or mumps, the difference
be one of principle or kind, but of degree only; for it is easy to
the repeated production of original cases as of a single one; of
e as of a sporadic generation. We cannot, however, declare that
typhous fever, originating independently of contagion, *may*
ntagious, it therefore *does*. Observation only can establish this
and when established, continued observation, and nothing else,
us whether it is true of all typhous fevers, or of a part only;
be admitted, that it might be true of some and not of others.

searching for facts to establish the generation of contagion in
ch originate from different causes, great circumspection is de-
We must even exclude many epidemics, subepidemics, and

for instance, typhous fevers are always lurking somewhere, and, therefore, contagion (if they originate it) is never extinct. When, from local conditions, an epidemic arises, characterized by contagious propagation, how is it possible to tell whether that propagation is from pre-existing sporadic cases of contagious typhous, or a contingent morbid secretion of the patient?

CHAPTER XI.

CLASSIFICATION OF CONTINUED FEVERS.

SECTION I.

1. The classification of continued fevers has long been one of the *opprobria medicorum*.

By some writers they have been distinguished by their origin or place of prevalence, as jail, ship, hospital, and camp fevers; but although some diversities of character may result from this diversity of origin, it cannot be doubted that they are essentially the same fever. The sources of diversity are obviously twofold.

1. In such localities the insalubrious conditions will seldom be exactly the same, and consequently there must be some variety in their morbid impressions, which may run through the whole course of the fever. Thus the impurities of a prison are different from those of a hospital, and the insalubrious atmosphere of a camp must necessarily vary from that of a ship. Yet all these modifications of cause and effect are within what may strictly be called specific limits—varieties in the cause necessarily giving varieties in the effect.

2. The inmates of prisons, hospitals, camps, and ships, differ from each other in the state of their constitutions. In the first there is simple and often insufficient diet, total want of exercise, filth, and confined air; in hospitals much exhalation from the bodies of the sick; in camps, intemperance and exposure to cold and wet; in ships similar exposure alternating with the breathing of confined air, loaded with foul exhalations from accumulations of their bilge, or from their timbers; lastly, a diet which produces or tends to produce a scorbutic diathesis. These different conditions of course predispose to corresponding variations in the type of the fever. For example, the soldier is likely to have pneumonia or bronchitis as a dangerous complication; while the sailor may suffer disproportionately from the scorbutic deterioration of his blood. We see, then, the full value of the distinctions drawn from the different localities in which the fever is generated, and must admit that they are not an adequate ground on which

different species. This conclusion is but a re-affirmation of ce made by some of our standard writers. Thus, Dr. Trotter,* of what have "been called hospital, jail, camp, low, slow, rid, and petechial fevers," says, "Any difference that has given names, in the nature of the fever, seems to have been more peculiarities of constitution, situation, climate, season, habits of the patient, than any real difference in the disease itself. We ten, among a number of men *living together*, the same infection ver, with all the variety of symptoms with which authors have rers under these appellations."

ier attempted distinction is into synochus and typhus. The the aspect of a patient laboring under the former in its early nother patient laboring under the latter in its advanced stages, very great. But extended observation has conclusively shown are in fact but different degrees or stages of the same fever. see a case of typhus, so called, that does not in its commence- with the nosological characteristics of synochus; and all Euro- nerican experience proves that, unchecked, the latter gradually the pathognomonic symptoms of the former. The extremes in range presented to us under these names, are indicated by the ia and typhus gravior. The former, by the acuteness of its symp- ely allied to the true phlegmasiæ; the latter is the most distant of any febrile affection. A synochus may commence as a typhus mitior as a synochus, and a typhus gravior as a fully yphus mitior. To speak in figurative language, one spirit whole—they have the same personal identity, but the external ns change, and the change is according to fixed laws—from imulating high inflammatory excitement to those which express d adynamic condition. When the fever sets in with the symp- characterize the typhous state, whether mild or malignant, the of the patient, or a modification of the remote cause or causes, med as the explanation. Previous enfeeblement is, of course, to the development of the *quasi*-inflammatory symptoms of synochus; and a concentrated poison may so depress the vital hose in previous health, as to generate symptoms of a malignant m the beginning. We see all this exemplified in scarlet fever. well represented by certain cases of scarlatina anginosa, and ior by certain cases of scarlatina maligna. Indeed, these two scarlet fever differ as widely in their symptoms as the synocha gravior of the nosologists. Another equally instructive illus- be drawn from autumnal fever; the difference in symptoms inflammatory remittent and a malignant or congestive remittent

* Medicina Nautica, p. 252. London, 1797.

being even quite as great as that between the most intense synocha, and the most irregular and adynamic typhus.

III. A particular symptom has been made the basis of an attempted classification. Some cases of continued fever are attended through a part of their course with maculæ or an efflorescence, others are not. Hence, there are, *prima facie*, two *species*, eruptive and non-eruptive. But this division does not bear even a superficial scrutiny; for no one has seen an epidemic typhous in which no maculæ appeared, nor one in which they were present in every case. Even in the same family, at the same time, they will appear on one patient and not on another, while the symptoms generally are identical, and all the etiological or antecedent circumstances the same. How, then, can *specific* distinctions be founded on this symptom? In the continued fevers there is doubtless a tendency to the pathological state on which maculæ depend; but it does not follow that they will always appear. Whole epidemics of malignant scarlatina may pass away without having presented a single case of well-developed rash. Of this kind is the disease formerly described under the name of malignant, ulcerous, or gangrenous sore throat, many of which cases present not the slightest efflorescence; and still they belong to the same species with other highly eruptive cases. Even small-pox ranges from a few aborting pimples, up to the confluent multitudes which envelope the patient in a coat of pus. With these facts before us, may we not ask whether in all cases of continued fever which are not arrested before a certain stage, maculæ are not to some extent present but escape detection? This, from *analogy*, may be affirmed; but it is not necessary to our present purpose that it should be established.

IV. Passing by the division into maculated and immaculated, and admitting a spotted aspect of the skin to be common, if not constant in the continued fevers, an attempt has been made to constitute two species, founded on the characteristic appearances of the spots themselves. This brings us to the proposed distinction into typhus and typhoid. The occurrence of exanthems or cutaneous spots in continued fevers, had been noted from the time of Fracastorius, in the early part of the sixteenth century,* and by Huxham, Hoffman, Pringle, Hildebrand, and other original observers, for three hundred years; but, down to Louis, no writer, as far as I know, had found in the differences presented by the cutaneous affections the signs of specific differences in those fevers. They were generally designated by the term petechiæ, and described as spots, or stigmata, varying in color from red to purple or black; sometimes few and small, at other times numerous, and running into patches or vibices. Occasionally assuming the character of a rash or true efflorescence, they would rise slightly above the general surface, and be followed by an exfoliation. In some patients limited to the trunk of the body, in others they extended to the limbs also. Always of a brighter red when they occurred earlier in the fever, or when its character

* Pringle's Obs. on Dis. of the Army, Part iii. ch. vii.

was less adynamic, they became darker with its progress, that is, with the increasing debility of solids, and deterioration of the blood. The pathological doctrine of putridity of that fluid, which prevailed throughout the period of which I have spoken, was well fitted to direct the attention of physicians strongly upon the purple or smoky color of these maculæ; but still there is sufficient evidence that spots of a much brighter red were often noticed. Thus, as far back as 1683, a petechial fever prevailed in Germany, which presented cases with "livid and yellowish petechiæ," and others "on whom the spots were few and red."* In 1780, Dr. Donald Monro described them as "small, distinct spots, of a reddish color," showing themselves in the same epidemic with other cases in which the "skin was marbled or variegated as in measles, but of a color more dull and lurid."† Later still, Hildebrand speaks of the "red-spotted exanthematous eruption of typhus," and of "red ecchymoses," so small as not to be observed without care.‡ Observations, which belong more properly to the present time, have confirmed those which have been cited, and established the fact, that in the epidemic reign of what appears from all the other symptoms to be one fever, maculæ of every kind, from distinct red dots, or, in the language of Fracastorius, lenticular spots, to lurid or purple vibices, or a miliary rash, may and do occur.

Now the celebrated Louis, and his followers, including two distinguished American observers, Dr. Jackson and Dr. Gerhard, have seized upon one of the varieties of this cutaneous affection, and under the name of the "rose-colored lenticular spots," endeavored to make it the sign of a fever specifically distinct from that which presents a different aspect of the skin. I cannot concur in this classification. We do not understand what pathological condition in the continued fevers tends to generate the various dottings of the skin, which a part of the cases present, but I cannot doubt, that it is essentially or specifically the same in all; whether the cutaneous affection appears in the form of rose-colored capillary congestions, purple extravasations, or miliary exanthems, followed by exfoliation of the cuticle. Indeed, if two species were to be formed by a reference to the maculæ of the skin they should not be of the kind proposed, but founded on the difference between the rose and purple spots on the one hand, and the pseudo-morbillous rash on the other; for the latter affection manifestly differs more widely from both of them than they do from each other. The difference between a passive, punctate congestion of red blood, in the capillaries, and petechiæ formed by its escape into the cellular tissues, is not as great as that between those conditions and the papulæ which rise so high as to roughen the skin and detach the cuticle. I am far from believing, however, that such a division into species should be made; for in the same epidemic and even on the same patients, all these forms of maculæ are sometimes

* Hoffman's Syst. of Pract. part I. ch. ii. § 3.
† Obs. on the Means of Preserving the Health of Soldiers, vol. i. p. 233. London, 1780.
‡ Gross' Translation, p. 44.

classification is still further reduced
of Paris, where the rose-colored spots
vision, they have not been seen in more
valle in the Interior Valley they are seldom
appeared to myself to see them in our indige-
has described an epidemic which in other
with the typhoid affection of Louis, and who
declares that they were "an extremely rare
we may say that as yet the attempt to divide
that shall be designated by the appearance

make the presence or absence of contagion
species of continued fever. But in the preced-
that epidemics may begin from local causes, and
contagion. It is also well known and has been
Interior Valley, where the inhabitants are insu-
could not have been produced by conta-
sprang from it, will co-exist, with symp-
Indeed, no respectable writer, as far as I know,
characters of contagious and non-contagious
symptoms, called malignant or putrid—great
and a hemorrhagic tendency—are spoken of by some
the absorption of contagion into the blood; but
They are evidences of an energetic action of the
us to decide whether that cause was a mias-
we know of the latter in the continued fevers,
specific us, and unreliable; that neither its pre-
by the symptoms; and that it is no better
than are the maculæ, which have just been
ject. We may indeed say of it, as was said
continued fevers a capacity for secreting
the secretion does not take place. In like
is established, there is a potential capa-
of the heterologous matter in nearly all
though in many cases it is limited to

—Many writers have divided the continued
We must not reject this kind of division
for a vitiation of the blood is unde-
the putrid deterioration of the blood
a fuliginous complexion, livid pete-
gangrenous predispositions; which of
symptoms of that species of fever; while

Typhoid Fever at Georgetown, Ky., p. 41.

ı variety occur very often in the same epidemic, and even in
ıily at the same time; finally, that contagion and maculæ have
ed to both. They cannot, therefore, be regarded as distinct

ISION BY PATHOLOGICAL ANATOMY.—The latest attempt at
tion of species has been by the pathological anatomists. This
ace to study the structural lesions found after death from con-
; and I shall only refer to them so far as may be necessary for
purpose. They have been made the basis of two species, cere-
lominal. According to Clutterbuck and many other British
ıus is an inflammation of the brain. The physicians of France
ıy, granting this, favor the idea of another species, in which
ammation in the abdominal organs, according to some in the
duodenum—of others, in the lower extremity of the ileum. In
ase the symptoms are in harmony with the cerebral disease; in
ith the abdominal. To this species they give various names, as
minalis, dothinenteritis, intestinal exanthem, and typhoid.
ıcting species we must have reference both to the symptoms and
l lesions. There must be a constancy of connection between
re is between loss of muscular power, insensibility, coma, slow
ertorous breathing in apoplexy, and the sanguineous engorge-
avasations in the brain, as found on dissection after death; or
frequent pulse, hot skin, headache, contracted pupil, delirium,
il, of cerebritis, and the capillary hyperæmia, lymphatic adhe-
rous effusions revealed by autopsy.
ıay take it as a fact that in continued fevers, this association of
d lesions is far more loose and uncertain than in the diseases
een named; for when the cerebral symptoms have been well

sistently establish a third—the thoracic or pulmonary. We should thus have the cerebral or typhus mitior of the British writers—the abdominal typhus or typhoid affection of the French and German—and the pneumonic typhoides of the American. These designations are founded in nature and may be retained, but they should be understood to express only varieties or modifications of a single species. In certain countries or classes of people, one variety may prevail for a time, in others, another—then, again, all may be present in the same town or family. Even the whole of these lesions are not unfrequently found in a single *post-mortem* examination. The truth is, that we must admit a constitutional, typhous diathesis, with varying localizations; and not specifically distinct, primary local inflammations, generating fever, as in the phlegmasiæ. If this be admitted, it follows as a corollary, that the labors of the Parisian school, have simply made us acquainted with a form of typhous not peculiar to their city, nor ever epidemic there, but sporadically prevalent among them for some time past: not absolutely, but relatively to other forms, more prevalent in that city than elsewhere.

SECTION II.

I. In the last section, I have endeavored to show that all the attempts to divide the continued or typhous fever into two or more distinct species, have been unsuccessful. I certainly so regard them; but want of previous, does not bar future success; and we cannot affirm, that because distinguishing specific characters have not been found in this group, none exist. The time was when measles and scarlatina were described as one fever; and it may be, that what nosology has done for *them*, may yet be done for the typhous fevers. Contemplated from any point which commands a view of the whole, they certainly present a diversity so great as to suggest different species; yet in this respect they are not without a parallel. In measles, the catarrh is sometimes absent, and the range of color in the exanthems is from ordinary to dark red. In scarlatina, we have a still greater diversity, some cases presenting no sore throat, others an inflammation of the fauces, with acute fever and extensive efflorescence; others, gangrene of the throat, and no eruption. In autumnal fever, we have even more varieties, many of which stand in striking contrast with each other, and *prima facie*, might claim (though unjustly), to be erected into distinct species. Remarks of the same kind are applicable to hysteria. In the original and admirable history of that malady, by Sydenham, we have a recognition of a great number and variety of morbid affections in different parts of the organism, out of which a thorough-going nosologist might construct almost as many species; yet that great observer saw in them all a common specific pathological character, which he indicated by the terms "hysteric passion."

There are animals which preserve the same type with remarkable
y, and are easily distinguished from cognate species of the same
genus; while other genera, as canis and felis, respectively present
which set analysis at defiance. In botany the same thing is true.
hile all the members of the genus quercus are strongly marked with
characters, those of salix and vitis offer to the practical botanist a
t unlike that presented to the nosologist by the typhous fevers. It
these cases the multiplication of approximating varieties, which
sses the labors of constructing species, as it is the diversity of symp-
d lesions in the continued fevers which renders their classification
ult. As the canon in natural history, is, or should be, that where
racters of a group equally require and oppose a division into distinct
the division should not be made, so in nosology. And regarding
ural group of continued fevers as of this kind, I shall speak of them
ituting a single species, as I have spoken of periodical fevers. Still
be convenient to employ many of the distinctive terms now in use,
some of these are manifestly improper, as for example, putrid, for
son that putridity of the blood has not been shown, and stands
to all we know of the animal economy; and typhoid, for the reason
the views we have taken it is not applied to a fever resembling, but
tual typhus fever. To the phrase abdominal or iliac typhus, there
no objection, provided that in the use of this as well as all other epi-
arieties only and not species are indicated. All classification requires
nclature for varieties as well as species. Thus we speak of annual
nnial henbane, and of idiopathic, infantile, and traumatic tetanus.

CHAPTER VII

velopment. It is well known, however, that the order in which the symptoms are developed in these fevers is neither constant nor uniform. Thus the cerebral symptoms may precede the abdominal, and contrariwise, the latter may be the first to occur; and it is equally well known that the vitiation of the blood may begin to manifest itself at an earlier or a later date, that the exanthems or the maculæ may follow the same latitudinarian rule, and that the pulmonary complications may exist from the beginning or occur only in the latter stages. A tendency to this irregularity pervades also the varieties of typhous fever, and in some is so decided as to have suggested the term ataxic, to express the want of order. With these facts before me, as I am not engaged in a systematic, elementary work, I do not propose to go into a minute and extended detail of symptoms, but rather to select those which are of a governing character, and acknowledged to be pathognomonic of the different varieties.

SECTION I.

OF THE FORMING STAGE.

I. Period of Incubation.—In cases of non-contagious sporadic typhus, it seldom happens that a remote cause can be recognised as having acted, and of course nothing can be said concerning the period of incubation. In epidemics, especially those of cities, the patients may have lived in insalubrious localities or habitations, and have been therefore constantly exposed for some time to the impress of miasms; or they may every day have come into communication with those who could impart contagion, and in all such cases, the time when the morbid impression was made is undefinable.

Our books, however, contain narratives which have a bearing on the question, and prove that the stage of incubation in continued fevers, as in the periodical, varies in length, through a range which separates them widely from the exanthemata. Thus there are well-attested cases of individuals having been seized immediately after being exposed to the offensive exhalations from the body or bedding of a fever patient, and a greater number in which the indisposition commenced in two or three days. On the other hand, there are facts which seem to show, that the period of incubation is sometimes extended through weeks or even months. Thus it is not uncommon to see Irish immigrants taken down with the fever several weeks after they have left the vessel which brought them over sea, in which they were exposed either to contagion or idio-miasm.

We shall, perhaps, never know all the causes of these variations in the length of the period of incubation. When its duration is very short, we may conclude either that the remote cause was uncommonly concentrated and virulent, or the individual peculiarly impressible, or both. Again, protection from, or exposure to exciting causes, undoubtedly affects the length of

tage of incubation. These causes, which play an unimportant part, if, d, any part at all, in the true eruptive fevers, have much to do in the ction of the typhous. When they are epidemic, many persons are d by the poison, and made weak and ailing; but the disease does not ce to full development in all, unless exposure to cold and moisture, or e other exciting or auxiliary cause, should come in aid of the first. idemic typhous of local origin, we may safely assume that the systems people within the locality are very generally impressed with the . There is a sort of epidemic incubation, which should be met by a spect avoidance of all auxiliary causes. The same thing is true of mal fever, yellow fever, and epidemic cholera, but not of the eruptive , with which certain varieties of typhous have been so often affiliated. reatly deferred period at which the fever may begin, after exposure to mote cause, must not be forgotten. Doubtless, many cases of typhous seemed to have arisen, as the expression is, *spontaneously*, were the ing of unknown or forgotten exposure to idio-miasma or contagion time before.

re are facts which seem to indicate that the remote causes of some of rieties of typhous are cumulative in their effects, and that a continued ure is often necessary to the production of the fever. This would st the propriety of not permitting an individual to be long exposed to alubrious atmosphere, but replacing each by a successor. In this t, again, the typhous fevers differ from the eruptive, which are gene- contracted by a single exposure to the contagion. I cannot doubt xposure through the night to a contagious or miasmatic atmosphere, re perilous than an equal exposure in the day. This may result from l causes, first, the more limited ventilation at night; second, the in- e of sleep in favoring the impress or absorption of the poison; third, xiliary influence of fatigue and loss of sleep in many of those who with the sick.

Stage of Development.—The onset of the continued fevers is d by depression of the vital forces, not less than perversion of the ions of the body generally. In the inflammatory, known as synocha ynochus, and in the rapid and malignant forms, this period is brief. e varieties represented by the typhus mitior of Cullen, and the typhoid is, we may say, in the continued fevers generally, the forming stage tracted, very commonly running on through many days, and, occa- lly, for two or three weeks, the patient almost imperceptibly growing . If, during this period, we seek for an organ whose functions were ted before those of any other—an original seat of the disease—we disappointed. From the commencement, much, if not the whole organ- s found affected, though, as in the subsequent stages, very unequally. e tongue is covered more or less with a foul, white, or yellowish fur, as not yet assumed a red color; the appetite, with a few exceptions,

is impaired or lost, and not unfrequently a sense of sinking is felt in the epigastrium, which, in malignant cases, is deep and threatening. Nausea is not uncommon, but vomiting does not often occur; and bile is seldom ejected, except in the latter part of summer or in autumn, when, after the impress of the heat of summer, the action of the liver is inordinate. In some instances, the bowels are torpid, in others, irritable; in many there is diarrhœa, with offensive but not bilious discharges, except in the season of the periodical fevers, and then not in all cases. In fact, the secretory function of the liver is, in most instances, suspended or impaired. The pulse is reduced in force and fulness, and sometimes increased in frequency. The circulation in the extremities and skin is diminished, a pallid or dusky hue appears, the perspiration is diminished, and the heat of the surface reduced, with occasional rigors, especially along the spine. The functions of the brain are invariably reduced in their activity and energy. The muscular movements of animal life are feeble and unsteady; the organs of sense lose much of their accustomed sensibility; the feelings are obtuse, and the intellectual functions enfeebled; dull head and backache is common; finally, the sleep of the patient is dreamy, unquiet, and unrefreshing.

If the disease be not arrested in this stage, all the symptoms increase; but a reaction is at hand. This, however, in some cases is very slight, and the early death of the patient indicates that his disease has consisted chiefly of a prolonged first stage.

In general, a deeper chilliness immediately precedes the stage of reaction; but it never equals that which occurs in an ordinary intermittent. I have not seen it amount to "a shake." In the worst cases it is generally least. In our autumnal remittent fever, the initial chilliness is about the same as in the continued fevers; but the two differ in this, that the chill may be repeated daily in a diminishing or increasing degree in the former, but is scarcely ever reproduced in the latter, except the patient have been exposed to the cause of periodical fever.

SECTION II.

STAGE OF EXCITEMENT.

I. STATE OF THE CIRCULATION.—The development of this stage out of the last presents much diversity. In the forms which have an affinity with the phlegmasiæ or phlogistic fevers, and are designated by the epithets synocha and synochus, the rise is rapid in proportion to the closeness of the affinity; and, in many cases, the physician is doubtful whether he has not a true inflammation to deal with, especially when, on bleeding his patient, he has evidence, in the buffy coat, of an actual hyperinosis of the blood. The acute pain which is often present in different parts of the system in these cases, still further suggests the presence of inflammation. These

may cease under an antiphlogistic treatment, but the fever will remain, s true character is then made manifest. Before, however, this dis- e is made by the treatment, the pulse instructively suggests the nature fever. Increased in frequency perhaps to 120, and augmented in e, its tension rarely exceeds that of health; and never, I think, te to what is expressed by the term "hardness" in the phlegmasiæ. discriminative language of Mr. Hunter, it is a pulse of action rather orce; of frequency more than momentum. Yet, without a careful on to its compressibility, its true character may not be ascertained. , under depletion, it loses less in fulness than it does in frequency, ognosis is favorable. On the other hand, and much oftener, blood- ; diminishes its volume, but augments its frequency; consequences are inauspicious. Yet this does not take place in every case, for nally an inflammation is established in some organ during the early of the stage of excitement, and then the pulse will be sustained, not, ne, as in the primary phlegmasiæ, but much better than when such mation is not set up; its supervention is, indeed, an evidence that a degree of inflammatory diathesis is present.

pulse in these varieties of continued fever is not the same throughout enty-four hours. A morning remission, or an afternoon or evening bation, are generally obvious, especially in malarial localities. The sent is greatest in the force and fulness, least in the frequency, of the ; and without the last, no favorable prediction can be made. The r the range between the remission and the exacerbation, the better is spect of a good issue. A full intermission may at length show itself. th the progress of time, the energy and fulness of the pulse gradually ut its frequency becomes greater, and thus a case which began as ha, will, after the lapse of a week, more or less, present the pulse belongs to the variety termed typhus mitior, to which we must now ttention.

distinguish between synochus and typhus mitior, in the beginning of cases of the latter, is quite impracticable. It would be like the pt to distinguish between states of the system identical in kind, but nt in degree. At a certain stage of the departure downwards, from ost inflammatory form of continued fever, we come to that which is the beginning denominated typhous. In this we have a pulse of r feebleness, of reduced, or at least not increased fulness, and of ated frequency. With the progress of the fever, these portentous es are augmented in many cases, and, sooner or later, a certain degree steadiness or intermission occurs, which is always the evidence of an orable progress. As a general fact, the earlier this faltering of the the worse is the prognosis. In certain protracted cases, which at last fatal, it may not occur for several weeks; in those which end favor- it seldom occurs at all.

In typhus gravior, or the malignant variety, which may end in death in a few days, the pulse of excitement can scarcely be said to have an existence. The heart participates in the deep and sudden depression of the vital forces, and a full and bounding pulse is not developed; on the contrary, it is feeble and fluttering. From the suddenness with which this pathological state is induced, it might be hoped that after bloodletting the pulse would rise in energy and acquire greater steadiness, and this *has* happened; but in general the loss of blood is followed by increase of weakness in the heart. A pulse of this kind in the early period of the stage of excitement portends a short and fatal course of the fever.

II. Of the Innervation.—Symptoms of disorder in the brain and nervous system of animal life show themselves in the stage of excitement as in the preceding stage of depression. Notwithstanding the increase of force in the circulation and action of the heart, which follows on the advance from one stage to the other, there is no true increase of voluntary power. On the other hand, the patient now takes to his bed, and is, in reference to locomotion, weaker than he was in the first stage. In the language of Dr. Rush, the excitement is concentrated in the bloodvessels, and withdrawn from the muscles. This condition of the muscles of locomotion is, however, common in phlegmasiæ, though in a degree less decided.

We have already seen that in the forming stage the functions of the brain are impaired. They now become more decidedly morbid. In the exacerbations of the fever, generally ranging from noon till midnight, more or less delirium manifests itself; at first of an active kind, but sooner or later of a low and muttering character. That which prompts the patient to locomotion gives in general the worst indication. The morbid vigilance which is so often present in the phlegmasiæ and in our autumnal remittent fever, is less common in our typhous fevers. On the contrary, at an early period in many, but not every case, a dull and drowsy condition arises. I have repeatedly seen it precede delirium, and, indeed, give the first unequivocal evidence of a typhous diathesis. With the progress of the fever it becomes more profound, but occasionally gives place to morbid vigilance, with wild delirium.

Another symptom equally characteristic of the typhous fever is subsultus tendinum, and the grasping at imaginary objects. These movements, almost confined to the upper extremities and the lips, often show themselves as early as coma or delirium, and are equally characteristic of these fevers. The union of the three, however slight may be their degree, establishes the diagnosis. Their increase shows the increasing gravity of the fever; their abatement as infallibly indicates its decline. The deep embarrassment of the brain, of which these symptoms are the offspring, is manifested in other modes. A certain degree of deafness, or a tinnitus aurium, is not unfrequent, but the eye is more affected than the ear. Its expression is altered, and while reduced in most cases to dulness, sometimes becomes unnaturally

ld and staring. The pupils are in general preternaturally contracted; but r and then one or both may be dilated. A sanguineous congestion of conjunctivæ appears, and with the progress of the fever a mucous secre- exudes from between the lids. Both hearing and vision are occasionally bid, and the patient believes that he hears or sees frightful sounds, or cts which have no existence around him; a condition which has been unaptly compared by some of our physicians to that of the senses and gination in *delirium tremens*.

he cases of typhous which present this striking development of cerebral iptoms without diarrhœa, are generally regarded by our physicians as stituting the typhus mitior of Cullen and the British writers generally; to this view there can be no objection, provided they mean a variety y, and not a distinct species. To view them otherwise, is to forget that se symptoms are all present, though in a mitigated degree, in every case fever which can claim admission into the typhous group; that no case of er, in which the whole are absent, can be with any propriety referred to t head. The true designation for such cases is cerebral typhus.

Pain is not among the prominent symptoms of the continued fevers, yet is never entirely absent, and is sometimes severe. In the forming stage generally occurs as a dull and heavy aching in the head, back, and limbs; t in the stage of excitement, it becomes more acute, and in some cases is ere, when it generates jactitation. When concentrated in the head, it y suggest inflammation of the cerebral membrane, especially when the te of the circulation may be in harmony with it. In many cases it is ted in the abdomen; but never assumes the acuteness of that dependent primary inflammation of the organs of that cavity. In a large number cases it is only felt or complained of under pressure or percussion, and en most acutely in the epigastrium, or the right iliac region. It is a rorable sign for the patient to complain of pain, provided he can indicate locality; but to moan as he lies untouched, or to complain under examiion, without a consciousness of the seat of his sufferings, shows a danger- s affection of the brain.

III. Symptoms in the Digestive System.—1. The tongue, in the rly periods of the stage of excitement, especially in cases which simulate e phlegmasia, presents the appearance which it wears in them. A white r covers its surface generally, which is often more copious along the edian line. Sometimes enlarged papillæ project through it. From the ginning the moisture of the mouth is deficient. Much earlier than in the e inflammatory fevers, the white color begins to change to a dirty yellow dead-leaf hue, the coating at the same time becoming drier. As it falls near the point of the organ, the mucous membrane is found unnaturally d, and the same complexion extends round the edges. In many cases, e point of the organ becomes compressed laterally and somewhat swollen, as to make a rude approach to a pyramidal form. The fur often dries on,

and seems to adhere to the mucous membrane, at the same time assuming a much darker color. In other cases it peels off, and the whole dorsum exhibits a raw, dark, and dry aspect, occasionally with transverse fissures. All experience has declared the kind of tongue here described to be eminently characteristic of a typhous diathesis. It is, indeed, one of the safest means of diagnosis, distinguishing those fevers, even in their early stages, from the phegmasiæ on the one hand, and certain constitutional hysterical irritations on the other, which last are characterised by a pale, broad, and flabby tongue. The dark-red aspect of the organ is generally regarded as indicating a serious lesion of the mucous membrane below, as conclusive evidence of abdominal typhus. It is, doubtless, present in most cases of that kind; but I have often seen it when the special symptoms of that variety were either absent, or few and very mild, and the signs of cerebral typhus were strongly marked. A slight retraction of the upper lip soon begins, and increases with the progress of the fever. The front teeth and gums become dry from exposure, and near the line of junction, a dark, tenacious matter, or inspissated sordes, collects upon the former, and becomes more considerable with the advance of the fever.

2. The pharynx is sometimes red and generally dry. Now and then there is pain, or inconvenience in deglutition. Being the seat of those, which throughout the stage of excitement is always urgent, it might be expected to show the appearance of sanguineous congestion.

3. The gastric symptoms are not often very urgent. As a general but not invariable fact the appetite is destroyed. Nausea, or even full vomiting, with constant irritability of the stomach, characterize some cases, which at the same time present great epigastric tenderness, indicative of mucous inflammation. As in the preceding stage, bile, at least in considerable quantities, is seldom thrown up in this stage of the fever; and on the whole it may be said that the gastric symptoms are less constant and severe in our continued than our periodical fevers.

4. The intestinal symptoms have attracted much attention. In some cases the bowels are torpid if cathartics be withheld, but readily pass into the opposite condition if they be administered. Constipation is generally regarded as an evidence of cerebral rather than intestinal complication; but it is now well known that constipation may be present when the bowels are the seat of serious lesion; and on the other hand diarrhœa may exist without organic lesion. Of the two conditions constipation is the least portentous. The alvine discharges in this as in the preceding stages are seldom bilious; except as far as a dirty greenish hue, sometimes present, may indicate bile. Occasionally they are dark, yet without blood. In the majority of cases they present a neutral aspect of sero-mucous and feculent matter, broken down and sending forth an abominable odor. When active purging has not been effected in the early stages, copious discharges of scybala have occurred spontaneously in the more advanced. Now and then the

ulcerations are dysenteric, when the two forms of disease are not blended the same epidemic, a combination, which as we shall see hereafter, pre- its great difficulty in the treatment.

Peritoneal tenderness, and pain in the absence of pressure or percussion, not present in all cases attended with intestinal lesion, but when pre- it may be taken as evidence of its existence. These symptoms are not ited to the right iliac region, though much oftener found there than else- re. A tympanitic fulness of that region, and a gurgling sound under sure from the movement of flatus, are regarded by Louis, Chomel, and ers, as pathognomonic of disease in Peyer's glands; but they certainly ur in some other abdominal affections; and that they do not depend on t lesion exclusively is proved by their general absence in phthisis, which ccompanied by inflammation and ulceration of those glands.

Throughout our Interior Valley, there is an increasing tendency in the fession, to refer all cases of continued fever which present a striking de- lopment of abdominal symptoms (especially when the cerebral are mild), the head of typhoid fever. This is generally done without any distinct ception of the relation between typhus and typhoid. The aim of those o make the reference is simply to identify *our* fevers, with those of Paris. need not here repeat, that the cases which present a striking display of testinal symptoms, can with no propriety be erected into a distinct species; d if they could, the term typhoid would violate every rule of philosophi- l nomenclature; while if we regard the cases to which it is applied, as nstituting a mere variety, it is equally objectionable, as involving no ypothesis, and simply indicating the most formidable localizations of the ver; the German phrase abdominal typhus, is every way preferable.*

5. The symptoms of hepatic derangement, in most cases entirely absent, re seldom multiplied or striking. Scarcely one at any time indicates in- lammation in the liver. Of its reduced secretion, I have already spoken. In autumn, however, both throughout the Interior Valley and in Europe, liary derangements, generating a sallow or jaundiced hue, have occasion- lly appeared in epidemic prevalence with those fevers.

6. The symptoms of splenitis so rarely appear that I have not seen them in a single instance, but the organ, subject to enlargement, sometimes ac- quires a size which impairs the resonance of the lower portions of the left side of the thorax; and might suggest a pulmonary complication.

IV. In the respiratory apparatus. At an early stage of the fever the breath of the patient becomes peculiar and somewhat offensive. It may be that the exhalations from the skin contribute to the effect produced on the senses. The odor has often served me to some extent as a distinguish-

* This deference to a celebrated name in a great European capital, by the physicians of a newly settled country is natural, and can scarcely be reproved; but the writings of Louis alone have not se- cured to him this tribute of respect; for they have not been generally read by us. It is to our own Professor Bartlett, the finished, elegant, and popular commentator of the French pathologist, more than to himself, that we should chiefly ascribe the currency which his views have obtained among us

ing characteristic between typhous fevers on the one hand, and the phlegmasiæ and remittent autumnal fevers on the other, which in the beginning are liable to be confounded. The ordinary symptoms of pulmonary lesion are in general absent or obscure. Many cases run their course without any serious affection of the lungs; but in others it occurs, and yet may not manifest itself by the ordinary symptoms of pain, stricture, dyspnœa, cough, and expectoration. In some instances it has only been revealed by a *post-mortem* inspection. This dumbness of the lungs under progressive disorganisation, is generally ascribed to the lesion of the functions of the brain. According to the necroscopic researches of Andral and other pathologists, the pleura is seldom affected, which may account, in part, for the absence of pain. A bronchial affection is more common, but pneumonic congestion is the usual lesion; and should be detected by percussion and auscultation. A rust-colored sputum is not always expectorated in these cases, for in many the hyperæmia is rather passive than active, especially when the pulmonary affection begins at an advanced period of the fever. A slow and imperfect respiration, a feeble action of the heart, and the long continued supine position of the patient, probably contribute mechanically to the production of the hyperæmia, and a pulmonary disorganisation which does not always present the anatomical characters of true pneumonia. The earlier the pulmonary affection begins, the more obvious are its manifestations. When it commences with the fever the disease properly takes on the name of pneumonia typhoides, or pulmonary typhous. In many portions of our Valley, the modification of continued fever we are now considering, is known under the names of lung fever and winter fever.

V. STATE OF THE CALORIFIC FUNCTION.—The heat in the stage of excitement is generally high and sustained. It has been described as leaving in the hand, when applied for some time, a pungent sensation. Perhaps it would be more correct to say, that such a sensation has followed the application of the hand, for the purpose of ascertaining the temperature of the skin. From the difficulty in a new country of obtaining suitable thermometers, and of using them in private practice, I have not made experiments, nor have I met with any, on the typhous fevers of the Interior Valley.

In London, Dr. Dimsdale made observations on twelve patients; the lowest heat, was 100°—the highest 105°—average, 102·2°.* Dr. Fordyce gives 105° as the maximum.† But Dr. Currie frequently found it 107°, and once as high as 109°.‡

The heat is not always in harmony with the energy of the circulation, for it may be high when the pulse is feeble. It abates in the morning, but not in general to the standard of health—following a law of decrease and increase—not of intermission and reproduction. The heat of the head and trunk is always greater than that of the extremities. In many cases the

* London Med. and Phys. Jour. vol. lx. p. 206. 1803. † Third Dissertation on Fever.
‡ Med. Rep. on the Effects of Water.

feet are cold, while the head is hot—always an unfavorable sign. In cases accompanied with feeble reaction, the heat may not rise above the natural degree. In malignant and rapidly fatal cases, it sometimes continues reduced below that degree; except in the head and trunk of the body.

There seems to be a propriety in placing hemorrhages and petechiæ under the same head.

VI. Hemorrhagic and Petechial Phenomena.—Hemorrhage from the nose in the first days of excitement occasionally occurs, and is not ominous. Very rarely the epistaxis has been profuse. Hemorrhage from the bowels takes place in a considerable number of cases; and is sometimes decidedly copious. Occurring before the disease is far advanced, it may be followed by mitigation of the fever, but when the patient is much exhausted, his condition is made worse. I do not think that hemorrhage is of as frequent occurrence in our typhous fevers as we have seen it is in yellow fever; yet it happens much oftener in them, than in our remittent autumnal fever; and it is worthy of observation, that it seldom occurs in the latter, till they have reached a typhoid stage. In latter years, the maculated, petechial, and exanthematous appearances of the skin, have attracted great attention. In speaking on the classification of the continued fevers, this part of their symptomatology has been to some extent anticipated. I think it may be received as a fact, that these cutaneous phenomena, in every form, are of less frequent occurrence in our Interior Valley than in Europe. Even there they cannot be ranked with the ever-present and essential nervous and cerebral symptoms.

The simplest cutaneous appearance is the red puncture or dot, often so small as to escape observation. It depends on a congestion of the capillaries, equally limited in extent. The turgescence of the vessels is sometimes so great, as to produce an elevation which can be felt. Pressure will at first empty the vessels, but the blood immediately returns into them. At a more advanced stage it cannot be pressed out. These are the rose-colored spots of Louis, to which so much importance has been attached, as significant of a distinct species of typhous. The term petechiæ has been applied to spots of the same kind, though in general of greater area, which exhibit a purplish or livid hue; in malignant, or very advanced cases, a sooty or even black color. When of great size they are called vibices. Many of these spots are true hemorrhages. Their complexion shows the presence of venous, instead of arterial blood. They are doubtless, in many cases, the sign of deep, perhaps undetected pulmonary congestion, impeding the due aeration of the blood. A rash or papillary congestion constitutes another variety, which gives a roughness to the skin, and sometimes leads to an exfoliation of the cuticle. This efflorescence may be either of a bright or dark red; following in that respect the same law with the maculæ or insulated spots. Occasionally the whole of these varieties will disappear, and reappear in the same attack of fever. They have all been seen at the same

time, or progressively on the same patient; but more commonly, in the same epidemic one patient exhibits the petechial spots—another the rash; and not unfrequently, epidemics follow the same rule. These various cutaneous affections appear much more on the trunk of the body than the extremities, and least of all on the face; thus differing widely from measles and small-pox, and conforming more to scarlatina. They vary from the whole, however, in not occurring at a definite period after the commencement of the fever. In referring to some authorities on this point, it may be well to go back to the time when the theoretical views which have latterly prevailed, had not yet been suggested, in doing which we shall see, moreover, that all the varieties were long since observed.

Huxham saw petechiæ appear from the fourth to the eleventh day; a miliary eruption from the seventh to the eleventh and still later. Pringle saw petechiæ of a "brighter or paler red, and sometimes of a livid color," on the breast, back, legs, and arms, as early as the fourth or fifth day, but sometimes not till the fourteenth.* Hoffman saw them appear on the fourth, fifth, or seventh day. Monro on the fourth, fifth, sixth, or seventh day; seldom after the eleventh or twelfth. Blane in the latter stages only; Trotter at different periods of the disease. Hildenbrand describes an "exanthematous eruption" as occurring about the fourth day. Of later writers, Cheyne saw "minute, purple stigmata, or the florid, marbled efflorescence," without elevation of the cuticle, about the fourth or fifth day. Dr. Barker saw a "morbillous efflorescence" appear from the fifth to the seventh day. Dr. Pickells saw petechial, freckled, mottled, or morbillous appearance generally beginning about the fourth or fifth day.

To come to later authors, Louis did not see rose-colored lenticular spots occur earlier than the sixth day; a greater number appeared on the tenth; in some patients they appeared between the twentieth and thirtieth, and in one not till the thirty-third. Chomel saw them occur from the sixth to the thirty-seventh day. Andral "most frequently saw them appear in the middle of the fever, sometimes towards the end, and even during convalescence; very seldom from the commencement." Dr. Gerhard saw the rash appear about the third day—the rose-colored spots a little later. Dr. Sutton saw the latter occur in the second week of the fever. The duration of the cutaneous affection is as irregular and various as its time of beginning.

I have already expressed the opinion, that we cannot construct different species of continued fever, by the guidance of the cutaneous affections, yet they may be advantageously studied in connection with other symptoms,—as for example, have the rose-colored petechiæ any peculiar relation to abdominal typhus, the livid to pulmonary typhus, and the exanthematous to the cerebral? When, moreover, the petechiæ are unusually numerous and livid, as happens in some epidemics, they may be appropriately called petechial.

* Rush's Pringle, p. 262.

Sudamina are less constant in their occurrence than the cutaneous affections which have been described; yet they occur much oftener in the typhous than our autumnal fevers. They appear in all the varieties of the former, and may coexist with every form of petechiæ and exanthema which has been described. They afford no aid to special diagnosis, nor do they assist us in prognosis. When the hot regimen was in vogue, they seem to have appeared more frequently than since a better treatment has been employed.

SECTION III.

PROGRESS AND TERMINATION OF THE FEVER.

I. The typhous fevers are indefinitely self-limited, and run their course in periods varying from two or three days to as many months. This might lead to the conclusion, that distinct species have been nosologically fused into one, did we not know that the same remark is applicable to our autumnal fevers. In both, however, the early termination, no treatment being employed, is generally in death.

II. The symptoms which have been narrated, present us with the phenomena of these fevers when fully established, which on the whole constitute their phenomena throughout. When tending to a fatal termination, these symptoms become graver; when a favorable issue is in store, a gradual amelioration occurs.

III. In the malignant, petechial, or syncopal typhus, the stage of excitement is a failure. A full reaction does not take place. The innervation is as it were blighted; the enfeebled heart fails to supply the brain and other vital organs with the requisite quantity of blood, and the lungs do not adequately aerate that which is sent through them; the heat and sensibility of the skin are impaired, and in many cases petechiæ and vibices, before absent, now make their appearance; a deep sense of oppression prevails in the organs of the great cavities; sometimes there is intense neuralgic or non-inflammatory headache; delirium and coma, with spasmodic actions of the muscles, supervene; dyspnœa and sighing show the oppressed state of the lungs and heart; the stomach is torpid or extremely irritable, and the bowels are inactive or affected with profuse watery diarrhœa. Cold perspirations, involuntary stools, insensibility and complete exhaustion, speedily follow, and death closes the scene. In various parts of the temperate portions of the Interior Valley, this atonic and adynamic variety of typhus has now and then shown itself, to a limited extent, chiefly in the winter season.

IV. But the ordinary progress and termination of our typhous fevers is widely different from these. The stage of excitement, once established, continues with but little variation, except that which results from a gradual ingravescence of the symptoms, especially the cerebral. Thus the subsultus

tendinum, and muscular debility, the delirium, coma, and insensibility suffer constant augmentation, the pulse becomes inordinately frequent, irregular, and feeble, the diarrhœa often increases, and the discharges always become more vitiated and offensive; the gurgling under abdominal pressure increases, and sometimes a general tympanitis supervenes; now and then a profuse discharge of black blood from the bowels still farther exhausts the vital powers; urine is still secreted, but the insensible bladder allows it to accumulate and be retained; the heat of the surface is apt to fail in the extremities, and partial perspirations, generally on the upper part of the body, appear; the petechiæ assume a still duskier and more ecchymosed aspect; the tongue, which the patient can no longer protrude, assumes a darker and drier hue; the retraction of the upper lip and the dryness and foulness of the exposed teeth, become greater; finally, the well-known and ominous sliding down in bed, clammy or cold watery sweats, suspended deglutition, hiccough, and the involuntary discharge of liquid fæces, exhaling an intolerable odor, and the profound stupor of the patient, foreshadow his impending death, to be followed by early putrefaction of the body.

V. But all cases of typhus which advance in the manner here pointed out, to a stage of extreme severity, do not terminate fatally. A sudden abatement, "a turn in the fever," to employ the popular phrase, a kind of crisis, sometimes takes place, and a returning normal state of the functions generally becomes manifest about the same time in the whole. But what is the period at which a fatal or a favorable ending takes place? It is certainly extremely various. If we take a week as the minimum, we shall find but few cases which conform to it; a far greater number run on to a fortnight; perhaps a greater number still to three weeks; while many reach a month. As a general fact, when the disease extends beyond that period, it undergoes, as we shall presently see, some degree of modification, both in its symptoms and mode of termination.

I have spoken of weeks, but neither the histories of our continued fevers nor those of Europe, show that in terminating, they observe hebdomadal periods, or any of the critical days so much insisted upon by the ancients and some modern writers. It is possible that this may be owing to the more active and perturbating treatment, which in this country especially prevails in modern times. Yet how is it possible to count the days of a fever which generally begins in a stealthy and a gradual manner, and often allows the patient to keep on his feet for two or three weeks, after the forming stage of the disease has actually set in. We can speak correctly of the duration of the eruptive fevers from the beginning, because this is not the case with them, because their onset is generally sudden, and still further, for the reason that new symptoms arise, and earlier ones disappear, to constitute and mark successive and tolerably uniform stadia; all of which is wanting in the group of fevers we are now studying.

VI. Continued fevers, which extend beyond a month, may still terminate

estoration, and thus the fever, in a modified and reduced degree, is
p. When the disease in the suffering organ is subdued, convalescence
es favorably, and the recovery is complete; but should the visceral
n prove incurable, death at last occurs, preceded by symptoms con-
ly different from those of an earlier termination, as well as from each

organs which suffer most are the brain, the bowels, the lungs, and
cen.

f the Brain.—If this organ, at an earlier stage of the fever, often
igns of real or supposed acute inflammation, such are not the pheno-
which it now exhibits; yet they may sometimes depend on a low
cute inflammation. Those which are most common, are slight sub-
or muscular irregularity, occasional dull headache, with a sense of
ess or constriction, more or less drowsiness, a slight delirium at
with or without morbid vigilance, a contracted or dilated condition
pupils, and a dulness or imbecility of mind, which sometimes con-
after the patient has begun to walk about. In a family in which I
e individual affected in the manner last mentioned, another passed
h a short period of actual insanity. When such cases prove fatal,
de of death is nearly the same with that from original inflammation
brain.

Of the Bowels.—Many protracted cases are complicated with obstinate
ea, and a continued excretion of morbid matters. The liver is gene-
rpid, as appears from the prevailing absence of bile; and this may
mes keep up the diarrhœa; oftener, however, it depends on glandular
of the ileum, which frequently maintains the tenderness and gurgling
were present in the right iliac region at an earlier period of the fever.
erebral symptoms may continue, but in a greatly mitigated degree.
gh the appetite of the patient may be partially restored, he continues

inflammation, the result of intestinal perforation, and the escape of the contents of the bowels into the cavity of the peritoneum. The duration of these symptoms is various, according to the area of the opening. In many cases, death occurs within twenty-four hours; others are more protracted, and when the aperture is small, and early adhesive inflammation closes it up, recovery may still take place. In some instances the original fever may so far cease that the patient will leave his bed, ride out, and regard himself as nearly well, when the symptoms of a fatal termination may be suddenly and unexpectedly developed.

3. *In the Lungs.*—We have reason to believe that many protracted cases of continued fever are complicated with occult pneumonia, or pulmonary congestion. In such cases the cerebral and abdominal symptoms may abate so far that full convalescence is anticipated, but not realized. Percussion and auscultation may detect that which was but equivocally indicated by the rational symptoms. They, however, may at length be more fully developed, and in proportion as this takes place, the original febrile symptoms disappear, to be preceded by evening hectical paroxysms, followed by morning sweats. Recovery may take place under remedies addressed to the suffering organ; but not unfrequently the patient gradually sinks under an imitative phthisis. In some cases, during the fever, a deposit of tubercular matter is effected, and true phthisis ensues. We know this in the Interior Valley by the symptoms and physical signs, and Andral has ascertained it by dissection in the hospitals of Paris.

4. *In the Spleen.*—I have already referred to the softening and enlargement of the spleen in the typhous fevers, and the difficulty of detecting those lesions during life. It is impossible to say how far they may contribute to prolong fever; but from analogy, I am disposed to assign to them a positive influence in that way. We are familiar with the fact that the same, or a similar affection of that organ, from autumnal fever, retards recovery, and favors relapses; and why should it not exert a like effect in the continued fevers? Why may we not assume that some protracted cases, in which, day after day, we are expecting to see a decided convalescence begin, are maintained by this condition of the spleen?

CHAPTER XIII.

PATHOLOGICAL ANATOMY OF TYPHOUS FEVERS.

[THE materials for the construction of this chapter, in the handwriting of the author, are extremely fragmentary; much of the original manuscript being probably lost or mislaid, and what remains bearing evidence of h been intended to be rewritten.—ED.]

I. THE BRAIN AND ITS MEMBRANES.—1. *Effusion of Coagulable*

Lymph.—The solid contents of the cranium present but few traces of inflammation, if we insist on the presence of effusions of coagulable lymph as the evidence of that pathological state; and this is true of the continued fevers, which have received the name of typhus, not less than of those called typhoid. In the Dublin epidemic of 1813, '14, and '15, Dr. Percival seems not to have discovered such effusions.* In that of 1817–18, according to Dr. Macartney, they were equally rare.† Dr. Reid, however, found "various adhesions" of the membranes.‡ In the epidemic of 1826, Mr. Jacob made six dissections, in one of which he found traces of effused lymph.§ In the fever of the same year at Edinburgh, Dr. Alison made dissections, but says nothing of lymphatic effusions.‖ In the fever of the same city, from 1836 to 1839, Dr. Reid examined the brain in forty-three cases; but in his report of the morbid appearances, says nothing of such effusions.¶ In ten dissections, made by Dr. West in St. Bartholomew's Hospital, London, slight opacity of the arachnoid was found in two.** In Paris, Louis examined the brains of forty-six patients dead of what he calls typhoid fever, and found effusion of lymph in two only.†† In the same city, Andral did not find such effusions in more than one out of seventy-one cases of the same fever.‡‡ In Philadelphia, Dr. Gerhard examined the bodies of many who died of what he calls typhus, and gives the history of six, none of which presented any traces of effused lymph.§§ From these researches, we see that in different and distant places, typhous fevers of various kinds terminate fatally, without being accompanied, in a great majority of cases, with effusions, affording the only indubitable evidences of previous inflammation, if we except purulent ones.

2. *Suppuration.*—This morbid change is even still more rare than the preceding one.

3. *Sanguineous Congestion.*—This is so common a morbid appearance, that it seems unnecessary to multiply authorities in detail. It has been found in the fevers denominated typhus and typhoid, in England, Ireland, Scotland, France, and the United States. In some cases it has been chiefly observed in the sinuses and veins, in others in the capillaries, sometimes in the pia mater, at others in the subarachnoid cellular tissue, the convolutions, and even the white matter, to which they have imparted a rose-color. In a few cases, limited extravasations have taken place.

4. *Serous Effusions.*—These, as a consequence of the congestion just named, although not invariably present, are very commonly met with. In general, they are not very copious. Sometimes they are subarachnoid, in others ventricular. Like the congestions, they are found after death in all the varieties of typhous fever.

* Trans. of Assoc. of Fellows and Licentiates of King's and Queen's Coll. vol. i. p. 303.
† Ibid. vol. ii. p. 574. ‡ Ibid. vol. iii. p. 29. § Ibid. vol. v. p. 512.
‖ Edin. Med. and Surg. J. vol. xxviii. p. 233. ¶ Ibid. vol. iii. p. 448.
** Ibid. vol. i. p. 131. †† Researches on Typ. Fever, vol. i. p. 318.
‡‡ Clinical Med. vol. i. p. 185 (Amer. Ed.). §§ Amer. Jour. vol. xix. p. 303.

Are these congestions and effusions to be taken as evidences of inflammation? I cannot so regard them. The general absence of fibrinous and purulent effusion, of hyperinosis of the blood, and of softening or induration, the great topographical extent of the congestion and its equability, the predominance in many cases of venous blood, and the almost constant presence of serous effusion, the legitimate product of simple congestion, all stand opposed to the conclusion that these hyperæmias indicate previous inflammatory action.

I come then to the conclusion, first, that although inflammation of the brain may sometimes be set up in the progress of all the varieties of continued fever, none of them are to be regarded as primary phlegmasiæ of that organ or its meninges; second, that all the varieties are in many cases productive of simple congestions and consequent serous effusions.

Dr. Clutterbuck, if I am not mistaken, was the first writer who attempted to identify the typhous fevers with primary cerebral inflammation. The failure of an antiphlogistic treatment to arrest them, had already, *de jure* if not *de facto*, proved his speculation incorrect, when pathological anatomy confirmed the conclusions derived from therapeutics. Even allowing all the sanguineous congestions to be received in evidence of inflammation, these conclusions must still be regarded as legitimate, since in numerous fatal cases of the fevers we are considering, the absence of such congestion proves that there could have been no inflammation.

The quotations which have been made, let it be observed, refer to all the modifications of typhous fever; as far as the morbid anatomy of the brain can speak, therefore, it pronounces them but varieties of one disease. It does not, in fact, announce that cerebral lesions are more common and extensive in the fever denominated typhus than in that lately called typhoid, but apart from the question of degree, it assures us that they are the same in kind.

II. In the Thoracic Viscera.—1. *Lungs.*—In the continued fever of Paris, according to Andral, the bronchial membrane and pleura are generally sound. In a number of cases, the parenchyma of the lungs had become impervious to air, and presented a brown or livid red color and pulpy consistence, resembling a softened spleen. In some cases, the more unequivocal signs of pneumonia were present.

In 15 out of 43 cases examined by Dr. Reid in Edinburgh, the lungs were normal. In 10 out of 23 subjects, the posterior part of the lungs was in a state of congestion, to such a degree as to sink in water; yet that pathologist did not observe the granular aspect so characteristic of inflammation. In several, the organ was œdematous; in one case only did he observe what he regarded as evidences of true pneumonia.

In about one-third of the subjects examined by Louis, the l
natural. In many of the subjects which presented pulmonary l
anterior and upper portions of the lung were commonly sound. The

nd posterior presented a bluish-red color, were destitute of air, sank in ater, on incision gave out under pressure a great quantity of thick, red quid, but afterwards displayed no granulated aspect of hepatization, were ot friable but resistent to the finger, presenting a lesion which that dis-inguished pathologist very justly regarded as distinct from inflammation, nd to which he gave the name of "splenification." In a considerable umber of cases, however, he found manifest inflammation, nearly always imited to a small part of the organ, and productive of hepatization. These wo lesions he found to exist in inverse proportions. In some subjects here were small abscesses.

Dr. Gerhard (*loco citato*), in his dissections of those who died of "typhus ever" in the Philadelphia epidemic of 1836, found the lungs in the same ondition that Louis found them in the "typhoid affection" of Paris.

Both these authors, and most others except Andral, have more or less requently seen congestions of the respiratory mucous membrane.

The observations of Dr. West, of London, on the condition of the lungs n those who died of "typhous exanthemations," agree with those of Louis.

As additional facts would not change the premises materially, we may safely say that the lungs, like the brain, do not afford much evidence of inflammation. That such does sometimes occur is certainly true; but the lesion characteristic of the fevers under consideration is simple congestion without fibrinous effusion; and the morbid appearances are substantially the same in the fevers of Edinburgh, London, Paris, and Philadelphia. All observers concur in representing that pulmonary lesions do not in general exist from the beginning of continued fevers, but insidiously supervene during their progress, being, in fact, like those of the brain, secondary affections.

2. *Heart.*—Dr. Gerhard found the heart softened in three cases, several ounces of bloody serum in the pericardium in one, one ounce of blood in another. Dr. West rarely found any affection of heart or pericardium, except some increased secretion in the latter.

In ninety-eight cases, Andral found traces of lesion in but thirteen; in two of these, softening; in some, pallor and flabbiness; in none, unusual red tints.

In the forty-six cases reported by Louis, there was less consistence than natural in twenty-four cases; in seven probably within the limits of soundness, leaving seventeen, or more than a third, affected with softening. The heart was also paler and drier than usual.

Dr. Reid reports the heart sound in all but three out of forty-three, and in these the lesion was of old standing.

We may state that on the whole the heart is less frequently affected than the lungs; the lesions observed are by no means the result of any preceding inflammatory action, and are of the same kind in the fevers of different countries.

III. Abdominal Organs.—1. *Stomach.*—Of forty-one cases, Dr. Reid

found this organ normal in thirty-one. In four there was thickening the mucous membrane, with a mammelonated appearance. In one, numerous rounded superficial depressions. In three, signs of softening from the action of the gastric juice; in one, the redness of congestion.

In six dissections, Mr. Jacob, of Dublin, found evidences of congestion of the mucous membrane of the stomach in two, patches of extravasation in one.

M. Louis found softening and thinning of the mucous membrane in nine cases out of forty-six, it being healthy in thirteen. Simple softening was found in a much larger proportion. The color was generally a mixture of red and gray. A mammelonated state of the membrane existed in thirteen subjects, generally complicated with softening; and there was commonly congestion in the neighborhood of the mammelonated parts. These appearances were most frequently found in the bodies of those who had died early in the disease. Louis does not regard these lesions as peculiar to typhoid fever, having found them in nearly the same proportions in other acute diseases.

In several cases, Andral found no appreciable lesion; in a greater number red spots, or a general slight injection of the mucous membrane; in a few, thickening of the membrane; in a greater number, softening, with a white, gray, brown, or red color. In some there were ecchymosed spots, in some ulceration. Andral thinks these appearances common in other diseases, and that but few of them are caused by inflammation.

Dr. West found the stomach healthy in three out of ten; in two there were lesions of old standing; in three congestion and softening; in one universal rose-color, with ecchymoses near the cardia.

Dr. Gerhard found softening of the mucous membrane, in one case extending to all the coats in the cardiac portion; and, in some cases, a more or less marked and deep slate color. For the rest, he agrees with the authorities already quoted.

2. *Duodenum.*—In eight out of twenty-two subjects, Louis found the duodenum normal; in other cases it presented evidences of congestion, softening, enlargement of the small glands near the pylorus, or small ulcers. He remarks that such appearances are not uncommon in those dead of other diseases.

Andral "seldom found the duodenum affected."

3. *Small Intestines.*—According to Dr. Reid of Edinburgh, of forty-one cases in which autopsy was performed, the glands of Peyer were "apparent and distinctly defined" in twenty-four; in six barely visible; in eleven not apparent; in four, the solitary glands near the lower end of the ileum were also "distinctly visible." In all such cases they were of a bluish or grayish color, dotted over with dark spots. In four cases only were they distinctly elevated. In two only was there any appearance of ulceration of the membrane, but in some there was ulceration of the solitary glands.

Of 101 cases examined by Dr. Horne, from 1833 to 1837, the elliptic patches were distinct and enlarged in twenty-seven, in seven there was ulceration, in two perforation.

Dr. Goodwin, Jr., in ten dissections found elevation and ulceration of Peyer's and Brunner's glands in all, perforation in four.

Dr. Perry, of Glasgow, found lesion of the glands of Peyer in a sixth part of those who died of the fever in that city.*

According to Louis, the mucous membrane of the small intestines was white in thirteen cases out of forty-six, and the proportion was greatest among those who died earliest, being gray in eleven that died at a later period. In fifteen dying in all stages of the fever indiscriminately, it was red; in four cases tinged yellow by infiltration of bile. It had a natural consistence in nine cases, being more or less softened in all the rest.

In the whole of the forty-six cases, the glands of Peyer were more or less affected, and the mucous membrane often unsound. In the first stage of morbid alteration they were but slightly elevated, being of a faint rose-color, the grayish points indicating orifices having disappeared. Advancing, they assumed a granulated appearance, and showed the orifices of the crypts open. To this succeeded a redder, larger, and softer condition, and finally ulceration was established. In eight out of the forty-six, perforation had taken place. All these different stages were occasionally presented in the same individual, making it appear that the elliptical patches do not become affected simultaneously but successively.

Louis found the solitary glands more or less affected in twelve cases of the forty-six, always near the cœcum. They were generally flattened and white, though sometimes of a ruddy or gray color. In some cases they were ulcerated.

Andral speaks of the small intestine as sometimes normal, though in some cases there was vascular injection of the lower part of the ileum, and sometimes the villi only were so affected.

He has reported twenty-seven cases with autopsies of what he regards as "dothien-enteritis," or "typhoid affection." Of these, seven could not, from their symptoms, claim to be regarded as typhous, yet a lesion of Peyer's glands was found in all. These are Nos. 1, 2, 7, 8, 9, 10, and 11. On the other hand, he has given many cases in which typhous symptoms were present without lesion of the elliptical patches. In six of these there were abdominal symptoms, in three, abdominal maculæ.

4. *Large Intestines.*—[The manuscript materials for the further construction of this chapter are entirely wanting. Not having access to all the sources whence the author derived the materials already incorporated in the text, the editor adds the following concise statement for completeness' sake.

The morbid appearances presented on *post-mortem* examination of the

* Edin. Med. and Surg. Journ. for Jan. 1836.

found this organ normal in thirty-one. In four ther ...rely, an ab-
the mucous membrane, with a mammelonated appearan... mucous mem-
rounded superficial depressions. In three, signs of ... others. In cases
action of the gastric juice; in one, the redness of ... more particularly

In six dissections, Mr. Jacob, of Dublin, found
of the mucous membrane of the stomach in two ... healthy, sometimes
in one. ..., very rarely presenting

M. Louis found softening and thinning of the ... that the glands nearest
cases out of forty-six, it being healthy in thi... has been supposed to be
found in a much larger proportion. The co...les, but there is a lack of
red and gray. A mammelonated state of the ... the former on the latter.
subjects, generally complicated with softenin... invariable relation between
gestion in the neighborhood of the mamm... apparatus and the morbid
were most frequently found in the bodies ...sive lesions having been
the disease. Louis does not regard ... any of the pathological
fever, having found them in nearly ... of constant occurrence in
diseases.

In several cases, Andral found ... change observed in the liver
red spots, or a general slight ... is not so frequently found
thickening of the membrane ... a drier appearance and feel,
gray, brown, or red color. ... sometimes softened. The
ulceration. Andral thinks ..., or thick, dark, grumous,
and that but few of them ar... anything peculiar to typhous

Dr. West found the stomac...
were lesions of old standin... commonly, but by no means inva-
universal rose-color, with ... and softening are the most fre-

Dr. Gerhard found soft... condition. The softening is
tending to all the coats in... almost pulpy in its consistence.
or less marked and deep ... usually almost black. Dr. Gerhard
thorities already quoted. ..., Louis four out of forty-six.

2. *Duodenum.*—In ... appearance.—These present only
duodenum normal; in ... in a healthy state.
softening, enlargeme... the abdominal cavity is occasionally
He remarks that s... can be considered essentially
other diseases. ... characteristic of that form

Andral "seldo... and the softening of the

3. *Small Inte...*
cases in which a ...ently changed in its physical
and distinctly d... in two-seven out of fifty-four
apparent; in f... cases, with dark coagula in
also "distinct" ... in six. According to Rudolf
color, dotted ... condition of the blood, bear a close
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...rine in all cases not
...a being in proportion
...found mixed with the
..., however, is not very
...death takes place by as-

...R XIV.

TYPHOUS FEVER.

...e in which the onset is generally gradual,
... prone to persist a long time, is not neces-
...minent local affection, in which the pulse is
... not preternaturally full or strong, in which the
... which in its progress is attended by subsultus
... delirium. * * * *

... by their symptoms, to throw the various forms of
... ups, but to ascertain the peculiar pathological actions
...stablish in the mind the conception of different modes of
...rresponding to the different symptoms, is a difficult, per-
...ask. For the solution of this problem, we can only refer
...a during life, and the lesions found after death. The for-
... the latter effects of morbid functions. The actions them-
... matters of observation, but inference. We are compelled to
... their existence, and equally required to believe in their diversity
...fferent groups of fevers, and also to a smaller extent, in the diffe-
...mbers of the same group.

tempting to assign the causes of these diversities, we are led in the
...ce to the external circumstances or agents on which fevers depend.
it to be a universal truth, that every agent which is capable of acting
vital susceptibilities, produces an effect peculiar to itself. Many, it
are so analogous, as for example, the different kinds of food or alco-
rink, that the effects, salutary or morbid, which they produce, may
ily confounded; but others, as the occult influence which generates
al fever, the vicissitudes of atmospheric temperature and humidity
meite phlogistic fevers, and the animal poisons which occasion small-
l measles, are specifically different in their *modus agendi* and effects.
e etiology, then, that we must look for the primary and principal
of variety in the type of fever. In the phlegmasiæ, or phlogistic
we have one type, in the periodical fevers another, in yellow fever
, in the eruptive fevers another, in the typhous another. Each of

large intestine, are analogous to those ... susceptible of subdivision. sence of all lesion in some cases, chan... cause or causes common brane, especially reddening, thicken... specific differences in the terminating at a late period of th... group, as in the eruptive about the cœcum; in rarer cases, ... causes of pathological dif-

5. *Mesenteric Glands.*—These ... fection or inflammation, always enlarged, or enlarged and indur... ecurrence in the other groups. points of purulent deposition. ... many of the symptoms vary like the cœcum are those principal... a veil as analogical element of in consequence of a prior aff... gical modification is to be found evidence to prove any necessa... whether strictly physiological as

It is generally allowed th... idiosyncrasy, and acclimation, or the symptoms of special aff... ...ments of living unfavorable to sound appearances on *post-mort*... diseases. wholly unrevealed by su... action, assuming many modifica- changes observed peculi... and then still farther subdivided. them.

6. *Liver.*—There is ... ...er. would be going into the general than in the stomach ... ...r subject is but a single group, the diseased at all. It ... ...ever, to study the characteristics of more rarely darker... ...erence to those which are peculiar to bile is either healt... less abundant. ... lesions indicate a wide range of fevers, or not ... The former have been observed in ... ...ter in every organ. Thus the signs

7. *Splee...* ... unite in demonstrating the riably, mor... quently ob... ...s and fluids are involved. The great sometime... ...and organic; the coextensive and It is gene... ...both the circulation and constitu- found th... ...r their normal condition, and as a

8. *Th...* ...subordinate functions of digestion, occasion... ...sensation, and motion, are

As ... found ... ...ner in which this morbid affection conne... ...e, the primary influence of of di... ...plete organism or tissue, where splee... ...ally affects the whole body, pro- I... ...ther organs in inflammation. char... ...matory morbid impression is Ch... ...it is propagated through the nin... ...whole organism is involved. th... ...hypothesis, whether the remote rel... ...being absorbed) upon the is ... ...there is a humoral modification

st be stated. It may be that the remote cause
i, and altering the constitution of that fluid, its
on the solids becomes the immediate pathological cause
condition. The theory of a non-inflammatory morbid impres-
exclude inflammation from the fevers we are considering, but
ndary, a consequence and not a cause of the fever. We must
comparative evidence in favor of a primary and a secondary

matory origin of typhous fever is suggested by two facts;
inflammation *can* excite fever; second, that in those we are
-symptoms and ravages of inflammation are generally seen.
data their inflammatory origin has been deduced; but the con-
not warranted by the premises; for it has not been shown that
arise without an antecedent inflammation, and we know that it
duce that local affection. The brain, or its envelopes, the mucous
brane of the stomach and duodenum, and the glands of the ileum have,
fferent pathologists, been designated as the seats of the primary inflam-
n. It is difficult to perceive why the lungs and spleen, especially the
, should not have been added to the catalogue, as their lesions are
y as constant as those of the other organs. When all of them are
l affected in the same subject, how can the pathologist decide on the
t lesion? He cannot do it by comparing them with each other; for
em to be of the same age; nor by a reference to the symptoms, for in
rous instances *their* appearance is contemporary, and even when those
yed by different organs are successive, it does not prove that the
on of one organ *causes* that of another, any more than the successive
ance of anasarca, ascites, and hydrothorax, in organic disease of the
or heart, proves one of those dropsical effusions to be the cause of
er. Moreover, each of the lesions which have been named is absent
ferent well-characterized cases of typhous, even in the same epidemic;
, some of them, on which much stress has been laid, as, for example,
fection of the glands of Peyer, are much more limited than those found
her and more vital parts, which latter, however, are declared to be
dary or derivative; still further, in many dissections of those who have
f these fevers, no inflammatory lesions whatever were found. Finally,
ign to these fevers a local inflammatory origin, is to blend them with
phlegmasiæ, which is forbidden to some extent by their etiology, and
greater degree by their symptoms, required treatment, and anatomical
ts. It may be admitted that some of these lesions are more frequent
others, as those of the brain in London, and of the Peyerian glands in
s; but this does not prove either of them aboriginal affections and the
s of the fever, unless it could be shown that inflammation never results
s that constitutional affection, which I presume no pathologist would
ept. I recognize the frequent presence of inflammation in the typhous

fevers, also that a true phlegmasiæ sometimes puts on the garb of typhous, when the system has become exhausted, and that after the causes of that type of fever have impressed the system, some other cause, which in a healthy body would have excited a phlegmasiæ, may develop an inflammation with an associated typhous fever; but I cannot believe that inflammation is necessary to the production of a typhous fever, or even favorable to it, but the reverse.

IV. The advocates of *primary* inflammation in the typhous fevers do not differ as widely from the advocates of primary fever and *secondary* inflammation as at first view might be supposed. Take, for example, the brain, spleen, and ileac follicles, as the most frequent seats of lesion, how can the noxious agents reach those parts without first acting on many others? And who will venture to declare that those others are insusceptible to the action of that agent? Such an assertion would be entirely gratuitous, and thus we are, I think, driven to the conclusion, that other parts of the organism must be morbidly impressed before those which have been named, which is, in fact, all that the theory of a constitutional origin of the inflammations in the fevers now under consideration requires.

Much stress has been laid on the well-known fact that inflammation from causes entirely topical in their application, does occasion fever; but this argument in favor of the inflammatory origin of *all* fevers, loses its conclusiveness when opposed by the well-ascertained fact, that inflammations arise in the progress of fevers. These are said, however, to be sympathies with the organ first inflamed, but this is an assumption in every case in which we do not have proofs of an inflammation antecedent to the fever. Moreover, there are facts which prove that fevers *do* originate inflammation. Thus an autumnal intermittent which within the few first days can be cured by liberal doses of opium and sulphate of quinine, may if neglected, present well-marked splenitis, which will render those medicines ineffective till after a free bleeding, and in small-pox everything indicates that the fever precedes all local inflammation. Facts in support of this theory, may even be drawn from the phlegmasiæ themselves. Thus every physician has met with cases of rheumatism and pneumonia, in which the fever preceded the inflammation, the local affection seeming to be the offspring of the constitutional. Commonly, however, they arise at the same time, and it is probable that in many cases of typhous an inflammation arises simultaneously with the hot stage. During the depression, the capillary circulation of some organ has become stagnant, and the vessels over-distended, in consequence of which, when general febrile reaction occurs, local inflammatory reaction arises; such an inflammation, however, is not the cause, but a part of the fever. It may be that visceral passive hyperæmia may continue for a while after the fever has been established, and then change to active hyperæmia or inflammation.

V. From the facts and arguments which have been stated, I am satisfied

ıg remain an open question. Up to the present time, all attempts nect causes, symptoms, and anatomical lesions, as to construct dis- l permanent species, have in my own opinion been unsuccessful. that one febrile diathesis is common to the whole, while the local vary according to no fixed law.

ıous diathesis with the capability of generating inflammation (so ing granted, we are prepared to expect a diversified exhibition of local ıone of which would be always necessarily present. We may draw ctive lesson on this point from that form of constitutional irritation alled hysteria. It may not only arise from a great variety of causes, ose the typhous diathesis to arise, but what is more to our present it falls with energy on various organs, even in the same paroxysm of patient. But more especially in different individuals, it may show diabetes, colic, vomiting, dyspnœa, palpitation of the heart, hemi- d even insanity; yet no one would undertake to construct different ıt of these local irritations. Again, our autumnal fevers, which make le species, characterized by what I may hypothetically call a malarial generate various anatomical lesions, none of which are always pre- d the same fevers leave behind them a neuralgic diathesis, out of se in different cases, neuralgias of nearly all the organs of the ; no physician would attempt to erect them into a separate species, ıguish the whole from the fixed and persistent *tic douloureux*, which regard as specifically distinct.

various analogies we may conclude, that there are predisposing or auxiliary causes, which modify the local ravages of the typhous , some of which may even extend to whole communities or races, or ırough particular epochs, and yet constitute no solid foundation for pecies. Goitre is accompanied with cretinism in the mountains of but not in our Interior Valley. In the tropical regions remittent

signally diversify the local lesions in a typhous diathesis? And may we not thus understand how, in different countries and among individuals in the same country, there may be a great variety, and yet the constitutional affection be everywhere specifically the same?

The symptoms are necessarily modified by the local affections, while the aspect of the constitutional diathesis remains unchanged. They cannot of course be the same when the brain suffers most, as when the lungs or the glands of the ileum and mesentery are the chief seats of lesion; yet the character of the fever may still be accurately expressed by the same word. This change once took place in an epidemic of this country, which began as a petechial or spotted fever, and ended as a typhoid pneumonia. Every physician observed the difference in certain symptoms, yet no one failed to recognize the *same* typhous diathesis in both, constituting them essentially the same fever. To the study of this diathesis we must now apply ourselves.

VI. Lesion of Innervation.—The history of the typhous fevers indicates an early, if not a primary, morbid state of the innervation; which all the phenomena declare to be one of adynamia with irritation: a failure in the *vis nervosa*, with perversion; a degradation, with abnormal molecular actions. When the nervous system, to employ an expression metaphorically, is thus crippled, we may expect to see the functions to the performance of which it contributes—which it sustains, co-ordinates, and harmonizes—enfeebled and disordered; and such is their condition in the fevers we are now considering. The whole of them present the same type of morbid innervation; but in the beginning of some, as in the cases which have received the name of synochus, the nervous impairment and irregularity are moderate in degree; yet, should the disease not be arrested, they come at length to display all the characteristic phenomena of the class.

The typhous lesion of innervation is not like certain forms of constitutional irritation, produced by mechanical injuries or burns, or following hemorrhages, or hysterical agitations from uterine irritation or mental emotion, most of which are of transient duration; but on the contrary, it is prone to continue, and in many cases displays an ingravescence which no treatment can arrest. It is not always primary. For example, it often arises in the progress of a remittent autumnal fever, and sometimes in the latter stages of one of the acute phlegmasiæ; especially inflammation of the brain. It occurs also in some cases of erysipelas; in certain invasions of the eruptive fevers; and, occasionally, in epidemic dysentery. Thus while it may appear in the beginning of a fever (and constantly does in those which are properly called typhous) as the proximate or first effect of a remote cause or causes, it may arise *secondarily*, as a result of a p[illegible] exhaustion of the vital forces, or of a morbid condition of the blood.

Of course, there can be no general lesion of innervation without involvement of the nervous centres, both animal and organic. When the ferme,

residues are necessarily impaired; and hence the disordered state
d and special senses; the debility and irregularity of action of
s of animal life; the feeble contraction of the heart; the failure
llary circulation with a tendency to non-inflammatory congestions;
least, the failure in nutrition; and the production of a vitiated
of the secretions. In other cases, the irritation may especially
spinal cord, and in others still, we may suppose the ganglionic
suffer most, thus giving a variety in the symptoms which cannot
fully analyzed, till we acquire a more perfect knowledge of the
fluence of the different nervous centres on the functions of organic

he functions dependent on, or subordinate to the nervous, that of
motion both animal and organic is the most extensive. If the
ty of muscular fibre be not derived from the nervous system, the
f that system is a condition manifestly necessary to the normal
ce of muscular motion, both voluntary and involuntary. In most
rphus, an early impairment of muscular function is conspicuous,
before the termination of the fever, it becomes greater than in
disease except paralysis. The patient can neither protrude his
r maintain a posture in opposition to the force of gravitation; his
r the sphincter ani is lost, and he can no longer throw the bladder
muscles concerned in urinary excretion into action. It is worthy
: that involuntary discharges from the bowels often coexist with
of urine. This may possibly indicate that the intestinal secre-
more abnormal and irritating than the urinary; but other causes
quivocal. First, many of the medicines administered act directly
estinal mucous membrane, few or none likely to be given on that
dder; second, the food which is taken may remain undigested
ne by the results of its spontaneous decomposition an irritant to

Subsultus tendinum appears to depend on involuntary, feeble, irregular radiations of nervous influence from the brain or spinal cord, into certain muscles of animal life. I am not aware that those of organic life are ever affected in that manner. Why the muscles of the arms and hands are chiefly affected, I cannot say, unless it result from the incessant influence of the will over these extremities in health. In secondary typhous, occurring suddenly, after a late bleeding, in autumnal remittent fever, I have seen the greatest number of muscles affected with spasmodic twitching. The circumstances under which this muscular affection arises, not less than the influence of treatment, demonstrate that it does not depend on a state of super, but of sub-nervous excitement. Carphology, or pickings and grapings at unreal objects, are voluntary movements, resulting from motive. They sometimes extend to the whole muscular apparatus of animal life, as when the patient attempts to leave his bed and seek some other situation. Subsultus tendinum often exists without these morbid volitions, but they are invariably preceded or attended by *it*. They indicate, therefore, a more serious lesion of innervation. They may and undoubtedly do occur, in connection with cerebral inflammation; yet such cases, I am convinced, constitute exceptions, for I have seen them promptly and permanently subdued by the administration of narcotics.

The various forms of disordered muscular motion which have been described, may result from mere functional lesion of the nervous system; but occasionally we see extremital paralysis, squinting, and dilated pupil. These muscular affections indicate cerebral pressure from serous effusion, and are more ominous than the feeble morbid contractions produced by mere nervous irritation.

Morbid sensation and intellection, are other effects of the lesion of innervation in these fevers; the former prompts to carphology, the latter occasionally shows itself in the form of active delirium, suggesting (in some cases correctly), actual inflammation of the brain; yet in others, an antiphlogistic treatment gives no relief, while narcotics and stimulants produce beneficial effects, and therefore indicate mere irritation of the cerebral mass. The results of their administration are familiar to those which they afford in *mania à potu*. A medical judgment matured at the bedside of the sick is necessary to an accurate discrimination among these cases. The more common and characteristic muttering delirium, from which the patient may be temporarily redeemed by pointed interrogatories, is of a less doubtful character, and never I suppose indicates inflammatory orgasm of the brain. The reactive influence of the irritated organs, maintains simply an excited state of the imagination.

This outline of the principal effects of morbid innervation in the organs of intellection, sensation and motion is a mere statement of phenomena, not an explanation of their mode of production. This I suppose will be impracticable, until microscopic anatomy, and experimental physiology shall

, and experimentally assign to each its appropriate remedy, while ignorant of the intrinsic nature of the vital forces and the mole- ements of the organism even in health. The terms asthenia, debility, depression, enervation, exhaustion, simply suggest *re-* the vital powers resident in a tissue; the terms alteration, change, , morbid action, irritation, merely express a departure in *mode* physiological or normal working of those powers. The two are in the typhous fevers. The term irritation, borrowed from the figuratively used, to express a morbid condition of the body, has ed because of its vagueness; and many attempts have been made ts meaning, restrict its application, and fix its place in the science gy; but the time for making it a technical term of definite mean- t yet arrived. Meanwhile the profession will continue to employ aprehensive and convenient expression for many forms of disor- rvation, both local and general, for which perhaps no terms more ll *ever* be used. Some irritations accumulate blood in a part, and he proximate or immediate causes of inflammation—others do not. r in their effects on the capillary circulation. The congestion ad- elf to the eye, and diverts attention from the lesion of innerva- ı preceded and produced it; and which is as inscrutable as that s *not* generate a hyperæmia, or even occasions anæmia. The al state of the innervation, which we have reviewed, is doubtless t in the lesions of nutrition, secretion, and calorification, which are the typhous fevers; but we cannot follow it into these until we ired into the state of the circulation and the constitution of the hose maladies.

ESION OF THE CIRCULATION.—Daily observation on what takes ur own systems, and in those around us, while they are in health,

odical fevers of autumn, the frequency of contraction is paroxysmal, in the typhous, persistent, though not without a slight morning abatement. In cases of great malignity, the adynamia of the organ is extreme, constituting indeed one of the most dangerous elements of that pathological state. In this condition it wavers, and its contractions become unequal and irregular in their succession, a phenomenon which it commonly exhibits in advanced stages of milder cases.

But, as in other forms of fever, the central organ of the circulation is not the only portion affected. The arterial system participates in the lesion; and although it may be difficult to distinguish the irregularities of action which depend on the heart, from those resulting from the morbid condition of the vital properties and cohesion of the arteries themselves, the physician who has been accustomed to compare the state of the pulse in these fevers with that in certain non-febrile but morbid states of the circulation, feels that there is a difference. The arteries, however, which are merely conducting tubes, and have but a limited nervous endowment, participate less in the morbid condition, than the two extremities or poles of the sanguiferous system,—the heart and the capillary vessels.

The capillaries make up a large proportion of most of the vital organs; they are liberally endowed with nerves, derived, in the viscera, chiefly from the ganglionic system in other parts, mainly from the cerebro-spinal; they are the seats and instruments of active molecular function, and the quantity of blood which those of any organs contain, or transmit in a given time, while in a healthy condition, is various. Holding this position in the organism and functions of the body, they must of necessity be involved in the first failure or degradation of the nervous function, and hence the origin in part of those congestions and pseudo-inflammatory hyperæmiæ so characteristic of the typhous fevers. These occur in various organs and tissues; may exist for a time in one, then cease and form in another; or may coexist in several. By oppressing or otherwise deranging the functions of the part in which they occur, they modify the symptoms, and add a new element of danger. Inseparable from the typhous diathesis, they are found in all the forms under which it appears; and have been seized upon by some nosologists for the purpose of constructing species, while others with juster views of their origin have regarded them as a merely suggesting varieties.

The feebleness and irregularity of action in the heart and arterial system, seem to be connected with a molecular anatomical change. The former organ is often found softened. As there is no absolute standard of firmness, a small degree of softening may readily escape observation; and we are at liberty to infer its existence as a more frequent occurrence than the reported cases would strictly authorize. This softening is not, I presume, confined to the heart; but in all probability extends to the arteries, and explains in part the undefinable peculiarity of pulse, to which I have referred. The arterial tissue, however, from having less of true vital po-

LESION OF THE BLOOD.—Facts and observations which are gene-
nitted, demonstrate a lesion of the blood in the typhous fevers;
nat stage it begins, or in what it consists, are questions which can-
lly answered. That it sometimes precedes any lesion of the solids
obable from the following facts.

continued use of innutritious, or unhealthy diet, is well known to
e of typhus. Now it seems more reasonable to suppose that such
difies and degrades the constitution of the blood, than that it leaves
l unchanged, and exerts a noxious influence on the solids. A
lesion of the blood is well known to arise from unhealthy food,
een it and the typhous lesion, there are many resemblances. The
recover has been known to coalesce, as it were, with the former;
rating a more fatal disease than either uncombined.

our ships and penitentiaries, lodgings which are small, close, foul,
d, often generate a scorbutic diathesis, and under such circum-
e also see a typhous diathesis produced, which we may presume to be
inasmuch as the excretions from the skin and mucous membrane
gs are retarded, while peccant matters doubtless find their way
blood through the latter tissue. The exhalation of a violet odor
ine after inhaling the vapor of turpentine: the production of a
disease by sojourning in an apartment where quicksilver is slowly
d; and the offensive character of the perspiration in those who
st of their time in the dissecting room, as happened with Bichat,
nstrative of a pulmonary endosmosis, by which the blood may be
affected. It is well known moreover that a transient visit to the
f a typhous patient, is harmless, while to spend a night in his
t, with the doors and windows closed, is often followed by an
the same fever.

ay conclude then that in some cases of typhus, the initiatory

well assured; and we may safely conclude, that if either be changed from a normal state, the other must quickly become morbid. A deteriorated blood cannot therefore circulate through the organs, without immediately reducing and perverting their functions. We have not, however, more *a priori* or argumentative proof of sanguineous degradation. All our original writers describe the drawn blood in the more malignant forms of typhous fever, as signally changed from a natural condition. They have called it dissolved, even putrid. We, ourselves, have witnessed in some cases its imperfect, even insular coagulation, and the general absence of the buffy coat which characterizes the phlogistic fevers. But the blood of typhous patients has been submitted to a more rigorous examination. Andral and Gavarret have ascertained that there is very often a diminution of the fibrine; and never an increase, except upon the accidental rise of an inflammation. This decrease, however, is not a necessary condition to the existence of these fevers, for in their early stages and throughout the whole course of the milder cases, the fibrine keeps up to its ordinary proportion of three parts in a thousand. When, however, they assume a protracted form, or a malignant type, a decrease in the amount of fibrine is unfailing. On the other hand the red corpuscles are often increased, though sometimes diminished.

Not having an opportunity of consulting the original publications of Andral and Gavaret,* I have collected from Simon† the data (furnished by them) for an estimate of the proportion of these two elements, in six cases of the typhoid fever of Paris. Twenty bleedings were employed, and the average fibrine was 2·45, red corpuscles, 160·7; the healthy number of the former being 3·0, of the latter, 127·0. The lowest cipher for the fibrine was 0·9, the highest, 3·7; the lowest for the corpuscles, 64·0, the highest, 3·10, the extremes being found associated in the same blood.

Becquerel and Rodier‡ examined the blood of eleven typhoid patients. On the first bleeding, the average of the fibrine was 2·8, of the corpuscles, 127·4. Four of the patients were bled a second time, when the averages were, fibrine 2·3, corpuscles, 124·5. If we take the whole of the bleedings, numbering thirty-five, by these various experiments, and reduce them to mean terms, we have fibrine 2·5, corpuscles 146. The normal number for the former being 3, for the latter, 127. Thus, the fibrine had diminished 16·66 per cent., while the corpuscles had increased 14·97 per cent.

The reduction of fibrine in this fever, when severe or protracted, is unquestionable, but Andral inclines to the conclusion, that the excess of corpuscles should be referred to the physiological condition of those who are most liable to typhoid fever. But the augmentation seems to me so considerable and uniform as to demand an opposite conclusion. It is chiefly in the early stages, however, that this excess is decidedly manifest; in latter periods, the corpuscles not less than the fibrine are often diminished.

* Annales de Chimie et Physique. † Chemistry of Man. ‡ Chem. of Man.

To the diminution of fibrine in typhous fevers, that distinguished pathologist, with great plausibility, ascribes several of their characteristics.

1. The imperfect coagulation and loose texture of the clot, together with the general absence of a buffy coat.

2. The adynamia, at least in part.

3. The congestions so apt to form in these fevers, giving to the organs, as seen after death, a state of hyperæmia, without the products of inflammation.

4. The hemorrhages, in the form of petechiæ, or from the mucous membranes.

In the twenty bleedings by Andral and Gavarret, already mentioned, the average of solid residue from the serum was 86·4, that of healthy blood being 80. The same bleedings, together with fifteen by Becquerel and Rodier, gave for the water of the blood an average of 800, that of healthy blood being 790. These numbers indicate that the serous elements of the blood are so little augmented in typhoid fever, that we may regard the diminution of fibrine and increase of corpuscles (neither, however, invariable), as pathological characteristics of the blood in that fever. Of the comparative state of the blood in those forms of typhus which affect the brain rather than the abdominal viscera, we know too little to permit a general conclusion.

It is, I think, impossible not to believe that other changes than those which are found in the relative proportion of the proximate elements of the blood, must occur in the typhous fevers, changes which animal chemistry may never be able to define. Composed of the elements of all the solid tissues, and all the secretions; continually receiving new matters from without to be associated to itself, and old ones detached from the tissues to be ejected from the system, a more complex and diversified play of affinities goes forward in that fluid, than exists elsewhere in the organic or inorganic world. It is the office of the power which presides over and controls these affinities, to preserve them in a condition of unvarying equipoise; but to this power are opposed all the causes of disease; and whenever one of them prevails,—whenever a single composition or decomposition is interfered with, the whole concurring to one end, are or may be disturbed, although our means of examination may not enable us to perceive or estimate the character or extent of the lesion. Thus, if a fixed star should be annihilated or displaced from its position, a disturbing influence would spread throughout the physical heavens, which although not perceptible to a common observer, would be demonstrated as a necessary reality by the astronomer.

That lesions of the blood play an important part in the production of morbid states and phenomena in the typhous fevers, cannot, I think, be doubted.

1. They react upon the nervous system, and augment or maintain its irritation and depression, which conditions, in turn, increase the sanguineous degradation.

2. They act on the contractility of the muscular system, and contribute to the enfeeblement of that portion of the body. To the heart they are depressing irritants, maintaining it in perpetual morbid contraction, and thus preventing intermissions in the fever.

3. They explain in part the suspended state of nutrition, and the diminution of cohesion or softening so constantly present in all the tissues.

4. They probably occasion those hyperæmias so characteristic of the typhous fevers; most of which are passive, others active or inflammatory, according to the degree in which the fibrinous element of the blood is reduced or unreduced in quantity, or deteriorated in quality. For we may safely believe that unhealthy blood may not be able to make its way through the capillary vessels as readily as the healthy blood, which is their appropriate and genial stimulus.

To the diminution of fibrine, or the absence of any increase, we may, as already intimated, ascribe the infrequency of true inflammation in the typhous fevers. Careless or unskilful anatomists often confound *simple* with inflammatory congestion. This mistake has greatly misled the profession. But a small proportion of the congestions found in our *post-mortem* inspections in the typhous fevers, have been accompanied by those actions which constitute real inflammation. Serous effusion is common, fibrinous comparatively rare; and even when coagulating lymph is effused, it is not always plastic and highly organizable, as in the phlegmasiæ, indicating that the protein elements of the blood are not in a normal condition.

5. The non-inflammatory congestions may be, in part, the causes of the hemorrhages so frequent in these fevers, a diminution of vital cohesion in the vessels themselves, and a state of hyperinosis or diminished fibrine, contributing liberally to the same effect. In the early stages of the fever, the congestion is perhaps the chief cause of the hemorrhage, which is then often followed by mitigation of the symptoms; and, therefore, regarded as a favorable sign,—in the advanced stages, when it is generally more copious, the other pathological conditions are present, and the prognosis is therefore bad.

6. In the present state of our knowledge concerning the physiology of the spleen, it is not possible to connect the swelling and softening of that organ with the lesions of innervation, circulation, or blood, yet that they result from the two latter, cannot reasonably be questioned.

7. In the same category with the hemorrhages and splenic lesions, we may place the cutaneous, punctate hyperæmias, and extravasations, known under the name of rose-colored spots, petechiæ, and vibices. The earlier they occur in the fever the brighter is their red, and the more completely can they be made to disappear under pressure, no extravasation having yet taken place. In the more advanced stages, when the blood has arrived at a deeper deterioration and the parietes of the vessels have lost their firmness of texture, extravasation replaces congestion; the color of the spots is darker; and the prognosis from them is of course more unfavorable.

he rash or pimply efflorescence, which frequently occurs in the
fevers, it is more difficult to speak in connection with the patholo-
ndition of the blood. Of course every pimple however small con-
ientially of a congeries of capillaries injected with blood—is a limi-
eræmia. We may presume, that the tactile papillæ, each of which
ied with an artery, are the seats of this congestion and consequent
ment. It may be, however, that the sebaceous and sweat-glands
the seats of congestion, giving a pathological condition analogous
of the solitary and aggregated glands of the ileum, of which so
as been written in the works on these fevers.

eking further for a pathological cause of the cutaneous affections
yphous fevers, we may speculatively refer to the hypothesis of Lie-
it in the true eruptive fevers, a change is effected in the blood by
oduction of a specific ferment, to which change the cutaneous exan-
re to be attributed. Were this established, we might analogically
at the exanthems in certain typhous fevers have the same patholo-
use.

he lesion of the solitary and aggregated glands of the ileum, occur-
one form of typhous fever, appears to consist in a congestion, and
osit in them of a peculiar substance, which has been called the
material. The resemblance of this lesion, to that of the same
phthisis, will be at once perceived. Now it cannot be doubted that
nents of tubercle are developed in the blood, and thence secreted into
monary and various glandular tissues. We call such a condition
ercular diathesis; and may we not with equal propriety speak of a
diathesis? It seems to my own mind at least highly probable,
glandular lesions of the bowels are referable to a morbid condition
blood.

is well known, moreover, that the parotid and other glands are
o suppuration in the fevers we are now studying. Cellular abscesses
more common than in other forms of fever, and with the whole we
perhaps connect the bed-sores, which so often prove intractable.
e refer all these affections to lesions of the solids only? I see no
for such a restriction. On the contrary, while I would grant the
of lesions of innervation and circulation, I am disposed to believe,
esion of the blood is an important agent in their production.

There is no form of fever in which the secretions generally become
id and offensive as in the typhous. The exhalations from the lungs
n are offensive; the sordes or inspissated secretions of the mouth,
ecumulate on the teeth and gums present a repulsive—and of these
highly characteristic—aspect; the urine emits an offensive odor, a
bile is scarcely ever secreted, and the alvine discharges, exceedingly
ed in appearance, are in many cases intolerably fetid. That this
linary lesion of the whole secernent function arises in part from the

lesion of innervation, cannot be denied; but the deterioration of the blood is a more influential proximate cause. It may be unhesitatingly affirmed from all we know of the state of the secretions in various forms of non-febrile constitutional irritation, and in the phlegistic fevers, generally, that while supplied with healthy blood, no alteration in the condition of the glands and secreting surfaces can cause them to excrete such heterologous fluids, and we may as fearlessly affirm, that if the glandular apparatus were perfectly normal, it could not elaborate normal secretions from the deteriorated and degraded blood of typhus.

Our predecessors, in expressing this condition of that fluid by the term putrid, were not so far amiss as the bigoted solidists have pronounced them. The glands but combine elements furnished them by the blood, and if what they pour out have a stench which suggests putrefaction, a decomposition, at least bordering on that expressed by the term which they employed, seems to be indicated. It has been found, moreover, that the bodies of those who die early, and through the disease have exhibited a decided vitiation of the blood and secretions, putrefy long before the ordinary time, disclosing, as it were, that the process of decomposition had already commenced during life.

CHAPTER XV.

TREATMENT OF TYPHOUS FEVER.

SECTION I.

DIFFICULTIES, UNCERTAINTIES, AND FAILURES.

I. ALL the physicians who have met with typhous fevers, in any part of the Interior Valley, have had reason to complain of the results of treatment. Accustomed to resort to an active antiphlogistic method in the phlegmasiæ, they are generally successful; and understanding the invaluable antidotal properties of sulphate of quinine in our autumnal fevers, they administer it liberally, and in most cases arrest the fever if called in the early stage. Not so with the typhous fevers. At first view it might be supposed, that from their limited prevalence, the physicians of the Valley have not had adequate opportunities for studying them therapeutically, and there is perhaps some reality in the supposition; yet we must not forget their identity or very close resemblance to the typhous fevers of Europe, the book-study of which is not neglected, in a country which looks with filial dependence to the writings of its British ancestry. From Cullen down to Watson, nearly

all the systematic works of England, Scotland, and Ireland, have been illustrated and adapted to the climate and state of society of the United States by zealous and painstaking annotators, who have thus made them the standard authorities of the practitioners of the Interior Valley. Several French and German works, moreover, have from time to time been translated, and received with favor by us. It cannot then be said, that our disappointments have resulted from a neglect of European instruction; but should be referred to its inadequacy. I presume, however, that the practice recommended by our foreign teachers has been as successful here as elsewhere. The difficulty lies more in the nature of those fevers, than in the imperfect therapeutic science of Europe, or of its unfaithful application in America.

II. By different physicians of the Valley almost every part of the treatment advised in the Old World, has been pushed to its utmost limits. This is true of bloodletting, purging, calomel, tartar emetic, sulphate of quinine, stimulants, and blisters, each of which, made, by turns as it were, the principal, and others the auxiliary remedies, has been employed with our characteristic energy, till it was found to fail, and then abandoned. The whole, moreover, according to the varying states of the system have been employed in the same case, but so often with the same want of success, that many physicians have, in opinion if not in practice, come to regard all treatment as useless if not injurious. Not, however, to dwell on extreme views, I may say, that the most judicious physicians of the Valley have been brought by experience to the conclusion, that no method will cut short our typhous fevers, and that although much may be done to restrain their ravages, and secure a favorable termination, all decidedly debilitating or perturbating treatment is injurious and should be avoided; a conclusion which is supported by my own observation.

III. It may be profitable to devote a few paragraphs to the question, why the typhous fevers, as a general fact, cannot be arrested by treatment.

1. Those which arise from contagion may be thrown into the category of other contagious diseases, most of which are intractable. The eruptive fevers and hydrophobia have not yet been stopped in their course; but syphilis has. The fact that the typhous fevers have not a uniform duration like the eruptive, the uniformity of which, however, has been overrated, does not exclude them from this classification, for hydrophobia and syphilis have no definite times of continuance, although the latter has a succession of stages like small-pox. To refer the typhous fevers to this class, is not however an explanation of their obstinacy; but merely placing them in a position to be studied with those which have so long presented the same trait of character, that we have ceased to wonder at the failure of all our efforts to arrest them.

2. But there are cases of typhous which do not originate from conta-

ıd what shall be said of them? If we say of the others, that they ɔn a specific poison, which establishes in the system a peculiar action, not amenable to any known remedy, we cannot say it of ıich arise independently of such a cause. Yet we may believe that a law of innervation, that when it is perverted in the manner and degree which are necessary to the production of a typhous fever, its restoration to a normal condition may be little promoted by any medicinal agency. We may even say that the failure of our therapeutic efforts is an instructive index, or a good measure of the departure from a normal condition. The obvious perturbations of the nervous system, do not always enable us to estimate the obstinacy and danger of the lesion of innervation. These are disclosed to us by the of medication. Thus a neuralgia of the first branch of the fifth nerves is curable with sulphate of quinine, while the same degree and nd of pain in the second branch is not relieved by that medicine; and e agitations of the nervous system in hysteria are quite as manifest as ı hydrophobia, while the former are removed by assafœtida, and the latter c ntinue till death under any kind of treatment. Whether we shall ever h ıd a medicine whose impress will supersede the typhous irritation of the nervous system, as assafœtida subdues the hysterical, cannot before seen. Should such a remedy be found, the typhous fevers would be transferred from the incurable to the curable catalogue of maladies.

3. But the question before us is not fully answered, even granting the reality of these speculations. In searching for the causes of obstinate perseverance in these fevers, we must not overlook the lesion of the blood. The chlorotic lesion is removed by chalybeates, the scorbutic by the vegetable acids, but as yet we have discovered no remedy for the typhous lesion. In both those diseases there are serious lesions of function in the solids, yet they at once yield to the correction of the morbid states of the blood. Till the means of making those corrections were discovered, those diseases were intractable. Agents which acted primarily on the vital properties of the solids, did not reach them. May we not assume then that the lesion of the blood in typhus, is a cause of the endurance of that fever, and are we not authorized to hope that sooner or later, experience, which in many things goes ahead of philosophy, the *a posteriori* taking precedence of the *a priori*, will disclose to us some medicinal or dietetic agent, that will cut short the typhous fevers, or at least greatly contribute to that result.

I think we ought not to wonder at the protracted course of the typhous fevers, if we grant what I think cannot be denied,—a combined lesion of the innervation and the blood; for what organ, what vital force extrinsic to them is there, to right them up, when they are cast down? I reside the sustaining and restorative energies of the whole organis it is but reasonable to suppose that when they are both impaired, tn cess of functional reparation, the work of recuperation, must of nece

proceed slowly, and be accomplished at periods exceedingly various. In cases in which these two pathological conditions exist in a high degree, there is no rally of the forces of the system, and early death occurs, without anatomical lesions. In protracted cases the recovery is *gradatim*, and always takes place under the use of tonics and stimulants, which address themselves to the nervous system, and nourishing food, which affords a supply of new and healthy blood.

4. But there are other reasons still for the continued obstinacy of these fevers. The signal failure of the capillary circulation, with the consequent formation of passive hyperæmias and subacute inflammations in the vital and governing organs, cannot fail to co-operate in the resistance which the typhous diathesis makes to our treatment, while they constitute a chief element of danger in protracted cases. Every pathologist who admits them to be effects and not causes of the fever, will also admit the difficulty of reaching and removing them. Meanwhile they react perniciously on the morbid conditions of the general system which gave them birth, and which are of a kind that renders the ordinary remedies of inflammation improper. Some of these inflammations speedily generate organic lesions, as solidification of the lungs, softening of the spleen, or ulceration of the glands of the ileum, with suppurative inflammation of the mesenteric ganglia, which still further complicate the pathology of the case, and increase its obstinacy. It is worthy of remark, as contributing to the difficulties which these fevers present to the physician, that the various organic lesions which have been mentioned are frequently established so insidiously, that the process is not discovered during life, or until too late to arrest it.

Having taken these brief views of the inefficiency but not inutility of treatment in the typhous fevers, we must proceed to consider what can be done to moderate them, and secure a favorable termination.

SECTION II.

TREATMENT IN THE FORMING STAGE.

I. The forming stage of the typhous fevers presents much diversity. When one of them prevails in a malignant form, such as that which has been called typhus petechialis, the onset is generally sudden, and an opportunity of doing anything to arrest the full and fatal development of the disease is scarcely presented. On the other hand, those which commence with that kind of acuteness which affiliate them in symptoms with the phlegmasiæ, present but a brief period of depression, and the physician seldom sees them till the stage of reaction is established. In the greater number of cases, however, especially in those which are nosologically known as typhus mitior and typhoid affection, or by the older writers, as nervous fever, the access is insidious, indefinite, and protracted through many days; sometimes ap-

lly through several weeks, thus affording an opportunity for attempting g to arrest the forming malady.

uch cases, regard should be had to the circumstances under which the patient has been or is still living, as they may be the causes of the fever, and while they continue to act, will render all prophylactic measures powerless.

1. Thus if he have subsisted on unhealthy or innutritious food, which rarely happens in this country, that which is salubrious should be supplied. If the appetite of the patient, as sometimes happens, should be unimpaired, a reduction in the amount and complexity of his food will be indispensable.

2. If he have lived and lodged in l, crowded, and unventilated room, he should be immediately removed from it, and placed in a dry, pure, and temperate atmosphere.

3. If he should be in a family or a hospital where cases of the fever already exist, a separation from them is ndispensable, notwithstanding the apartment may be clean and well aired.

II. Of positive hygienic agencies, one of the most important is the application of cold water to the skin. Its capillary circulation, perspiratory function, calorific function, a sensibility, are always impaired in the forming stage. The cutaneous nerves are the chief seats of the sensibility to caloric, and are therefore especially susceptible to the sudden impress of cold water. When reaction does not take place, it may be promoted by rude frictions, or in extreme cases, by an antecedent or subsequent hot bath continued for a short time. Under the cold dash, the functions of the skin are restored or improved, and the contractility of the whole muscular system acted on. Indeed the depressed and degraded innervation is thus reached, when, perhaps, no other therapeutic agent could affect it. The results of this treatment are not always satisfactory, yet it should never be omitted, when the circumstances of the case admit of its being employed.

III. Among agencies decidedly medicinal, an emetic is the best. Few things extend their influence throughout the organism more decisively than full vomiting. An emetic is an alterant, and its operation is very generally followed by an improved condition of the contractility and sensibility of the organism at large. If it should be followed by an evacuation of the existing contents of the bowels, so much the better; but copious purging should be avoided.

IV. The bath and the vomiting or either of them prepares the way for another process which may complete the arrest of the forming disease. I refer to sweating, to which both these measures predispose. To pr the function of the skin, the patient, who often keeps on his feet in early stages of a typhous fever, must be put to bed and plied with sudor Should he be thirsty, and not have taken an emetic (to render cold w

ɡerous), he may swallow repeated draughts of that fluid, which will
ı bring on perspiration; but after an emetic, hot drinks will be pre-
ɔle. If the nausea have subsided, an infusion of the leaves of the
atorium perfoliatum will be useful; if he be still nauseated, an infusion
alm, sage, sassafras, or serpentaria, will be preferable. In general a
le opiate, as five grains of Dover's powder, fifteen drops of laudanum,
drachms of paregoric, or a corresponding dose of sulphate of morphine,
allay irritation, dispose to sleep, and excite the perspiratory function.
advantageous also, to combine with the Dover's powder, five grains of
mass or calomel, to reinstate the commonly suspended action of the
r. In some cases the vital forces are so low, that more stimulating
horetics are required, then hot whiskey, or gin and water should be
l. By whatever means this may be brought about, should a perspira-
come on, it should be maintained for many hours, the longer and the
e profuse the better. The system is not yet in a state of exhaustion,
the lost water of the blood is speedily replaced. Indeed it is compen-
d by the drinks which are administered. The sour and offensive smell of
perspiration which these cases often present, indicates that a real depura-
of the blood is thus effected, and the reactive influence on the nervous
em of an organ so extensive as the skin, brought into healthy function is
ıly salutary. The people themselves sometimes arrest this fever by
king a sweat," which consists largely in applications to the skin. In
epidemic of Uniontown, Pennsylvania, Dr. Fuller saw the fever thus
ten, by surrounding the patient with ears of Indian corn (maize), taken
of boiling water, hot herb teas being at the same time administered
rally.

uch a perspiration cannot, however, be always excited; it will be con-
l to the face and upper part of the body, or may not even appear on
a. Under such a failure, the patient is not left in the condition he was
re he became the subject of medical treatment; but is brought into
stage of reaction or full febrile excitement, at an earlier period than he
ht otherwise have reached it. This, however, does not constitute an
ction to the method, as a protracted forming stage with a slow reaction
ot desirable, for it is during the former that much of the mischief is
mplished; whatever, therefore, brings on febrile reaction tends to sim-
y the case, and render it more amenable to the treatment adapted to
fully formed fever, to the study of which we are now brought. But
re proceeding to it, I must say, that sufficient attention has not been
n by the profession generally to the therapeutics of the forming, in most
ances the only curable stage of the fever. It is that which corresponds
he first or diarrhœal stage of epidemic cholera; and although a typhous
r may not be as easily arrested as cholera in the first stadium, the suc-
l of treatment in the latter should encourage us in regard to the former.
l therapeutics of this stage differ widely from those of the next. A

g pathological condition is to be arrested, and to this end a powerful ...ession must be made on the system, as when we would change or over- ...e a vibration in a complicated machine, by a stronger raised by a dif- t agent applied in a different mode. A tender, sedative, and soothing ...od will not answer. The nervous, muscular, capillary and glandular ...ns must be aroused by their appropriate excitants, and the blood must be made to cast out through the latter, the matters which have become foreign to its constitution. To this end it is desirable that all the great emunctories should be excited into action. Secretion from the mucous membrane of the bowels is, however, too sedative and debilitating while it gives an inward tendency to the blood, and suspends the action of the skin, kidneys and liver; secretion ...dneys is less exhausting, but can- not always be excited, and ... ...ible with perspiration. Secretion from the liver does not prevent perspi...on, nor increase the general debility, but in its results from the action of bil...pon the bowels, tends to arrest the decline of the vital powers, and may ...refore be advantageously promoted. Of all the secretions, however, that o... ...e skin, carrying with it as is gene- rally the case increased secretion ... the lungs and liver, is most to be relied upon. Indeed, I doubt whe... ...e fever is ever arrested in the form- ing stage without the occurrence of ...piration. A patient who has been thus relieved is not to be negle... ... is somewhat in the condition of one in whom the fever has run a ...ign course and terminated by a crisis. He must be kept on moderate diet, take gentle tonics and restoratives, be preserved from diarrhœa, protected against cold and moisture, and have the functions of the skin and liver well supported, otherwise he may fall back.

Those who believe that the diseases we are now studying are symptomatic fevers, from antecedent inflammation of the brain, stomach, or ileum, will not of course concur in the practice here recommended. Yet apart from the possibility that their pathology may be erroneous, I think they might grant, that in the early stages of inflammations producing *such* constitutional lesions as exist in the typhous fevers, the remedies proposed might not only be harmless but perhaps the very best *antiphlogistics*. They should realize that our antiphlogistics are not all depletory and refrigerant.

It is to be regretted, however, that from the insidious onset of many cases of typhus, the patient suffers the forming and almost only curable stage to pass by, before he sends for medical aid.

SECTION III.

TREATMENT OF THE EARLIER PERIODS OF THE STATE OF EXCIT

THE STAGE OF EXCITEMENT NOT DEVELOPED.—In the highly malig typhous fevers, no successful reaction is established, and the disease may p

tal without advancing beyond the first stage. The object in such cases is raise a state of excitement, and the basis of the treatment is that which as just been recommended for arresting the fever in the forming stage. Then, however, the access of the disease has been violent, and the patient om previous good health and strength has been suddenly brought into a ate of extreme debility and depression, it will be advisable to bleed him. his is not done to subdue inflammation, for it does not exist; but to crease the contractility of the heart, arteries, and capillaries, and if possible to diminish the congestion of the brain, spinal cord, heart, lungs, and rtal viscera; within the whole or a part of which, not only the quantity f blood due to their physiological state, but most of that which should be und in the extremital and parietal portions of the body, is now accumulated. This visceral plethora, the consequence of a failure in the powers hich maintain the circulation, contributes still further to oppress those owers; which may thus be annihilated by the reactive influence of the sions of the circulation which that failure has generated. The results of enesection under such circumstances, are uncertain. When the impulse f the heart is feeble and the pulse weak and empty, reaction seldom llows; and when whatever energy they manifest before the operation, hey become weaker as the blood is drawn, no benefit, but the reverse, will result. Thus if a single bleeding should not produce reactionary excitement, no more should be attempted. But there are cases in which the ense of oppression and anguish indicates that the congestion is chiefly in single organ, as the brain, or those in a single cavity, the lungs and heart, r the epigastric viscera. In such cases cupping or leeching should never e omitted, and it may be resorted to when the vital forces are so much educed that venesection seems hazardous, or after that operation has been erformed without the desired result.

Happily we do not often meet with this dangerous modification of typhous ever in our Interior Valley. I have not seen it since the years 1824-5, nd in 1829, the epidemic described by Dr. Kirtland and Dr. Allen* presented many cases of this character. They did not find bloodletting necessary, and were led to place their chief reliance on stimulation, internal and external. The latter should be preferred whenever the susceptibility of the skin remains sufficient to give efficiency to the means employed. These may be hot cataplasms, sinapisms, blisters and rubefaction. The parts on which they will produce the greatest effect are the epigastrium and feet. The diffusible and narcotic stimulants are not to be overlooked in these cases, and hence, for internal administration, the aromatic carbonate of ammonia, phosphorus, tincture of camphor and muriatic acid are to be preferred. They should be given in such doses as to excite an early inflammatory action in the mucous membrane of the stomach and bowels. In the typhus syncopalis of New England Dr. [illegible]

* Ann. J. M.

single drop of the solution of arsenite of potash, given every hour, productive of good effects.

The whole object of the treatment in this stage is to promote reaction, or bring on febrile excitement: when this cannot be accomplished, the patient dies; when it can, he is merely brought into the condition of those in which the stage of excitement is spontaneously developed, and to that stage we must now give attention.

SECTION IV.

TREATMENT OF THE EARLY PART OF THE STAGE OF EXCITEMENT.

I. The state we are now to may be said to continue to the termination of the disease; but radual decline of intensity. Thus, the earlier periods are characteriz symptoms of febrile and even inflammatory excitement, its latter by se of adynamia and exhaustion, and the transition is in general gradua In many cases, or even whole epidemics, the febrile symptoms never b me acute and violent, but display a low and obstinate character, at once esting and forbidding both depletion and stimulation. Other forms howe designated by the terms synocha and synochus, in the beginning of stage simulate the phlegmasiæ so closely as to intimate a necessity for tl on of a vigorous antiphlogistic treatment. It cannot be doubted that such cases have a close affinity with the phlogistic fevers, and some of them are undoubtedly arrested by the treatment adapted to that group. A greater number, however, are but moderated in their inflammatory aspect, and continuing, very soon display symptoms essentially characteristic of the typhous diathesis. As no method of promptly or certainly correcting this diathesis, and terminating the congestions and sub-inflammations which attend it, has yet been discovered, we cannot lay down indications of cure, and class our remedial measures accordingly, but must treat of individual remedies and their union, according to the lights of experience, endeavoring, at the same time, to estimate on physiological principles, the *modus operandi* of each. I shall begin with—

II. The Hygienic Management.—Whatever may be the grade of febrile or phlogistic excitement, a strict attention to hygienic regulations is indispensable. The hair of the patient should be cut close, and he should be kept recumbent on a straw, husk, or hair mattress, a water-bed, or a mere sacking-bottom; his bed-clothes should be changed daily; no part of his body not usually exposed to the air and light should be left naked, but the covering should be of the lightest kind in summer, and at heavier than is necessary to prevent any part of the surface from bec cold. Whenever the temperature of the feet may fall below the n standard, and whether that of the head rise above it or not, it should be

current of air upon the patient), and the heat of the room maintained by an open fire, much to be preferred to a stove, as less offensive in its effects, and more promotive of ventilation. The chamber should be darkened, but reduced to a dim or subdued and uniform illumination; a stream of light, either from window or lamp, should be allowed to fall on the eye. The walls should be divested of paintings, and bright colors, especially that of complex figures, should be covered over, for the sight sometimes brings on or promotes delirium. All loud, shrill, or grating noises should be abated, and audible reading or continued conversation in the chamber should be prohibited; and, on the other hand, whispering should not be practised, as the patient is apt to become excited and irritated by unsatisfied curiosity. He is never injured by the degree of sound which are necessary to a clear perception of all that is spoken or said in his chamber, and the more intelligible everything is to his observation the better. He should not, however, be conversed with at all in relation to his wants and the means of cure; business should not be allowed to occupy his mind or excite his feelings, and visitors but those commissioned to wait upon him should be excluded. His diet should not be suspended, he should be kept on an antiphlogistic through the earlier stages of the fever, but as it advances, a more generous, as we shall presently see, will not only be safe but necessary. All exciting beverages should, through the early period, be withheld, but may be allowed *ad libitum*. Finally, I would complete the hygienic regimen by suggesting a daily alvine evacuation at the usual hour, procured by mild means; an attention to the regular evacuation of urine, and the preservation of a clean skin and mouth by frequent ablutions. The former should, indeed, be subjected to repeated washings, sponging, or effusions of tepid water, the revival of fever-temperature being the index, as

and perturbating medication, with the neglect of them which we so often see in practice. I will even venture a step further, and query whether this fever, which has hitherto in the main held its course in despite of the Materia Medica, would not, when simple, as often terminate in health under such circumstances, without as with the other means which we are taught to employ?* Upon those means we must now successively direct our attention.

III. Bloodletting.—General bloodletting is never employed but in the earlier stages of the typhous fevers; but local bleeding is held to be admissible in every stage. A great majority of the cases of typhous fever in our Valley do not present a stage of excitement that demands, or even justifies, the use of the lancet, and most of the physicians, whose histories are embodied in this article, have employed it sparingly or not at all. There are cases, however, if not epidemics, which seem to demand it. A sudden attack, a previously vigorous constitution, middle life, and a sanguine-bilious temperament, although there may be no inflammation developed, nor any actual hardness of the pulse, render it proper at the beginning to diminish the fulness of the bloodvessels. One liberal bleeding is generally sufficient. Every medicine which is afterwards administered will produce its wonted effect more successfully after such a reduction of the volume of the blood.

Another pathological condition, however, more imperatively calls for that remedy. With the rise of the hot stage, or soon after its establishment, an inflammation of the brain or its investments—of the lungs—of the mucous membrane of the stomach and duodenum, or of the lower extremity of the ileum, may manifest itself by unmistakable local symptoms, and a phlogistic hardness of the pulse. A full bleeding is then demanded. The blood will be sizy, and a repetition of the operation is sometimes called for. The case assimilates closely to the phlegmasiæ, and requires a similar treatment. It can never, however, be carried to the same extent. There is not a simple hyperinosis of the blood, a true phlogistic diathesis, but an inflammatory, typhous diathesis; the former element may be moderated by the loss of blood, but the latter cannot, and if the bleeding should be carried too far, it will be augmented. When, however, the energy of the pulse keeps up without increase of frequency, the fur of the tongue retains its whiteness, and neither coma nor subsultus tendinum begin to supervene, should the local symptoms still exist, a further and free resort to

* In an age and country like my own, where a liberal administration of medicines is expected by patients and regarded as a duty by physicians, the suggestions which have been made are not likely to inspire any dangerous reliance on the *medicina expectans*, and may even do good, as far as they have influence with any, by diminishing the officious and relentless efforts of art, directed in a different way. It is, in the author's opinion, desirable that in cities where fever hospitals place patients under the control of physicians and nurses, the experiment should be made of a purely hygienic method. If attempted, one thing should be added, namely, some inert substance, supposed by the patient to be medicinal, that he might have a definite means of cure on which to fix his imagination, and rest his hopes.

speedy disorganization of the affected viscus, if he be not bled; and he may sink exhausted. Even the suffering organ may still remain e of congestion, though the active molecular movements of inflam- nay not be going on. Such cases, when they occur, must be left to city of the physician who is so unfortunate as to encounter them.

questions which topical bleeding presents are less perplexing than e have considered. There are not many cases of any form of fever, nor any stage except the closing, in which it is not required, at may not be safely employed. Of course the object at all times ove some organ from congestion or inflammation. In the milder will do this (as far as the loss of blood can go) without a previous the lancet; and in the more violent and phlogistic forms, it is y fitted to complete the venesection began. Finally, in such cases, cribed, as are ambiguous, a resort to it, if practicable, may often he physician from his embarrassment.

reference to the historical portion of this article, Chap. III., where d accounts of the practice of more than thirty of our physicians are will be seen that, like their European brethren, while they agree al bleeding, they differ in their estimates of the value of general ing. Most of them had not employed it, several had given it a few cases, and found it injurious, or at least useless; others had it in the same patient, but a greater number had used it once only ase. On the whole, the weight of testimony, much of which, how- negative, lies against the use of the lancet. It may, I think, be that one bleeding in the earlier stages, will, in many cases, do no ble good or harm.

EMETICS.—In all times and places, emetics have been more or less d in typhous fevers. With my own preceptor, the late Dr. Go- he received his medical education in New York, in the last century

emetic; but gastritis constitutes a still stronger objection, and a careful inquiry into the state of the stomach should precede the decision in favor of that remedy. An accurate diagnosis, however, is not always practicable; for both epigastric tenderness under pressure and redness of the edges of the tongue, may exist without gastritis. I do not believe that this inflammation is a frequent accompaniment of our typhous fever; for I have seen emetics very often given with advantage, or at least impunity, when the symptoms just mentioned were present. During the temporary and partial reign of Broussaism over the physicians of the Valley, gastro-enteritis had a corresponding prevalence; at present we hear little of it, but much of ileo-cœcal embarrassment. The finger of diagnosis is turned from the epigastric to the iliac region.

An emetic unloads the stomach, often oppressed and irritated by undigested food and unhealthy secretions, to the reactive impress of which we may ascribe, in part at least, the morbid sensibility of that organ. The close contraction of the muscular tunic presses the sluggish or stagnant blood out of its capillary vessels. The nausea and the act of vomiting, reduce the powers of the heart and nervous centres, but *predispose* them to more energetic and normal action; and thus the pulse generally acquires greater fulness and force, and the innervation at large displays a healthier character. If the lungs are in a state of engorgement, or languid transmission of blood, or the bronchial tubes should be obstructed with unexpectorated mucus, considerable relief is obtained. If the portal viscera be engorged, their compression by the diaphragm and abdominal muscles impels the blood onward. Finally, as all experience teaches, the skin is reached, improved in its circulation, and disposed to perspiration. Every part of this may be temporary; but whatever exerts even a transient beneficial influence, without subsequent injury, should be regarded with favor, in a disease which only admits of palliation. As sleep, and a tendency to diaphoresis, generally follow the operation of the emetic, it should be administered in the evening, and followed by gentle sudorifics, with a moderate portion of some preparation of opium to calm the agitation of the nervous and muscular systems; and this administration will be especially advisable when there are apprehensions of gastritis; for by allaying the irritation of the stomach, that medicine will render the action of the emetic less injurious in reference to that disease. As to the repetition of the emetic no rule can be written down. In many cases a single one may, perhaps, confer all the benefits which vomiting can afford; but in the absence of gastritis, I am persuaded it may in many cases be repeated with advantage, especially when the congestion of the brain is little and that of the lungs great.

It appears from the histories which have been given that many of our physicians have prescribed emetics, but with varying and doubtful results. They have often brought on diarrhœa, especially when composed of tartarised antimony. In the early periods of the hot stage, their action on the bowels

ys injurious. But it is possible to administer an emetic when are irritable, without exciting their peristaltic action. This is ninistering a full dose of opium at night and the emetic early in g, to be followed in the decline of its operation by another opiate. metic is so managed as not to purge, it generally restrains diar- antiperistaltic action extends to the bowels in such a degree as out not invert their muscular movement. It is not indispen- ver, to employ tartar emetic, and when diarrhœa exists, ipecac. nflata may be substituted. Whatever is used should be given in as to vomit promptly, by which the danger of purging will be

TIC MEDICINES GIVEN AS ALTERANTS.—The administration of licines in nauseating or subnauseating doses has found more the profession generally than their exhibition to full vomiting. powers of the system are greatly reduced, or the bowels are irri- c. has been chosen; it is easy, however, by the addition of ender tartarized antimony quite as harmless, and I cannot doubt lterant and secernent, it is superior to ipecac. The exhibition timonial preparation in these fevers is a practice which belongs ssion. Discussions have sometimes arisen whether they should ered in nauseating doses. I have found the best administration hich the stomach can perceive, but under which it does not nute doses are in general sufficient; for the tolerance of this hich exists in some of the phlegmasiæ, is here absent—a thera- oof of pathological difference. The cases of fever in which I tartarized antimony most beneficial, are those which the nosolo- nochus, and those in which there are pulmonary complications. typhous diathesis is fully developed that medicine does less good, ady intimated, *may* do harm. Tartar emetic, slowly and perse- ministered, establishes in the system an impression of its own, ial action, under which the febrile action often gives way. At me, it exerts over the heart a sedative influence, which is espe- rtant in cases which seem to require the lancet. It relieves congestion, and increases bronchial secretion and expectoration. acts upon the skin, and assists in re-establishing its functions.

ner of its administration is, perhaps, not unimportant. I have iven it in the common saline or neutral mixture, each portion of half an ounce, containing from the fourth to the eighth or rain of the antimonial, every two hours, according to the degree of rgy and the idiosyncrasy of the patient. Dr. Gordon, as we have dministered it in connection with minute, or non-purgative doses of magnesia, with decided success. Indeed, he ascribes the t of the benefit to the sulphate, which he has given in five-grain out the antimonial, and with happy results. When entered

upon, it should be continued day and night until the fever abates, or the aspect of the case indicates that its effects are unfavorable. Such indication being given by the increasing irritability of the stomach, augmented frequency of pulse, and greater restlessness.

In cases to which it has a doubtful applicability, the spiritus Mindereri may be substituted for the less stimulating saline mixture, and a small quantity of laudanum, paregoric, or the acetate of morphia, should be added. The greatest objection to the tartar emetic solution is, perhaps, its tendency to excite the bowels; but here again it may be generally restrained by the addition of some preparation of opium—laudanum probably being the best. Such an addition cannot be injurious; for the cases in which the bowels are most irritable are least complicated with inflammation of the brain. The propriety of allowing cold drinks during the administration of this medicine is doubtful. It seems to induce a state of the stomach which renders that organ intolerant of cold draughts. This is unquestionably the case when it is administered as an emetic; for I have known two men destroyed by that indulgence, and in the third the production of a gastritis, which required the loss of a large quantity of blood for its subdual.

VI. CATHARTICS.—The testimony of our physicians, as far as I have become acquainted with it, is undividedly against active purging. Whenever promoted its effect seems to have been to lower the vital powers, and bring on increase of diarrhœa without removing a single symptom of the disease. In proportion to the feebleness of reaction is the injurious effect of purgation. I am happy to say, that none of them have fallen into the plan of allowing the bowels to remain costive from the beginning; and therefore none of them have reported the discharge of scybalæ in an advanced stage of the fever. We may, I think, feel assured that in every case of typhus, it is proper in commencing the treatment to evacuate the existing contents of the bowels not less than the stomach; and almost equally proper to guard against any great and long-continued accumulation of fecal matters or morbid secretions afterwards; but in both cases the operations should be limited to such evacuations. The mischief is done by their greater operation, which sinks the patient's strength, gives an introversion to the circulating blood, and when there is an affection of the glands of the ileum, contributes to aggravate it. Dr. Smith* informs us, that he had generally seen patients recover who were costive throughout the fever; but did their recovery result from their costiveness? Such cases I am disposed to think are in general the least dangerous, and in that may perhaps be found in part the reason of the favorable termination. I am not, however, either from therapeutic principle or experience, an advocate for any greater administration of cathartic medicines in these fevers, than is indicated in what has just been said. The earlier in the attack and the higher the tone

* Essay.

...r will be their benefits. In every stage of the ...especially in the earlier, an *actual* inflammation of ... increased alvine evacuation. Such a pathological ... seldom co-exists with diarrhœa. But how shall we ... simple febrile congestion and positive inflammation? ... perhaps one of the most difficult in diagnosis. The autopsic ... the typhous fevers which have been made in Europe and ... in the last twenty years, have shown that true inflammation ... or its envelops, is much rarer than was once supposed; and ... that delirium, coma vigil, contracted pupil, a red eye, and sub-... delirium, may exist without inflammation; yet they are present in that pathological condition. The greater force of the pulse, a firmer throb ... external carotids, less drowsiness, wilder delirium, and greater development of heat in the scalp and face, with a tendency to coldness of the feet, may be taken perhaps as proofs of inflammation, especially if the bowels be costive. To these I may add if the patient be bled until syncope is approaching, the absence of perspiration on the forehead and upper lip. This, however, like the appearance of the blood, presupposes the diagnostic decision to be made; yet such aids, in difficult cases, must not be rejected. Cerebral inflammation actually existing, and the fever not yet far advanced, the revulsion produced by active purging will be found an important means of relief. On the other hand, the cases which are complicated with a decided lesion of the glands of the ileum are those in which such a practice is most contraindicated.

Our physicians, generally, with great propriety reject both the irritating and hydragogue cathartics. The former on account of the condition of the mucous membrane and its glands, the latter on account of the low state of the vital forces of the system at large. Calomel or the blue-mass, or the latter rubbed down with chalk (*hyd. cum cret.*), is very properly employed by all; but in what for the Interior Valley are small doses, that is, from two to six or eight grains of either of the two former. We have perhaps no cathartics which irritate less, act more sparingly on the secretory apparatus of the mucous membrane, are followed in their operation by less exhaustion, or more seldom produce hypercatharsis. These are negative excellencies of a high order; but the mercurial preparations perform a positive benefit, by arousing the liver into action, and thus giving to the collatitious viscera all the aid which arises from their association with that organ in a (temporary) normal condition, instead of their continually sympathizing in its torpor.*

* I know of no writer who has so distinctly pointed out the beneficial influence of righting up or bounding the normal function of an organ, upon the other organs of the same group, as the late Dr. Robert Jackson of the British Army. His little work on the fevers of Jamaica and some portions of the United States, a model of its kind, fell into the author's hands as far back as the year 1804, when few works, or medical books of any kind, were as rare in the West, as many other fruits of civilization;

But still further, the bile is a natural stimulus of the bowels, which fall into torpor and morbid secretory action whenever it is withheld; and its restoration to those organs, even at intervals, in the typhous fevers, cannot fail to be salutary to them, and through them to other parts of the organism. Finally, when the function of the liver is impaired or suspended the elements which it carries out of the blood are retained, and contribute to its empoisonment and the depression of the innervation.

With these views, we are prepared to appreciate the value of mercurial laxatives in the typhous fevers; but we must not expect to maintain an unabated secretion of bile in all cases, for the liver participates in the pathological condition of the organism generally, and having a certain degree of periodicity in its secretory function, will at times fall back into a state of quiescence, in despite of a continued administration of mercurials.

But as aperients, these medicines sometimes fail, especially when they fail as cholagogues, and it becomes necessary to aid them with medicines more decidedly opening. In the early and more acute stages of the fever, the carbonate or sulphate of magnesia, the latter alone, or combined with a weak antimonial solution, will be proper; but in the more advanced periods, rhubarb, or an emulsion of castor oil and spirit of turpentine, should be preferred,—all of these being administered in gentle doses, and their excessive operation checked by an opiate. In place of these, however, emollient and slightly purgative enemata may be resorted to with advantage. These are thought to be especially required when constipation coexists with lesion of the glands of the ileum,—a rare union,—and there can be no objection to relying upon them in connection with mild mercurials, if they be thrown up so far as to secure an adequate evacuation of the lateral cells of the colon. When the brain is inflamed, large injections are peculiarly proper, from the physiological relations between that organ and the rectum.

As to the frequency of evacuation in these fevers, I would say that when purgatives are administered, two or three operations are sufficient, and that in the absence of diarrhœa, an evacuation once a day or once in two days, is as much as should be desired.

VII. Mercurials as Alterants.—The amount of calomel or blue mass required to excite the liver and bowels, will not in general affect the system at large or produce salivation. Calomel has, therefore, been administered to the production of a mercurial diathesis. I have in former times given it with that view, and many other physicians of the Interior Valley have done the same. By this treatment, the condition of the patient has sometimes been improved, but I have never seen the fever arrested, and the mercurial irritation has not unfrequently seemed to blend itself with the

and the perusal of it made an impression which remains to this hour, in union with a feeling of respect and thankfulness, that insists on being recorded. The few physicians who, at that time, were students in the wilderness, must have recollections that will lead them to pardon this personal reminiscence, should it perhaps justly be regarded as in doubtful taste by younger members of the profession.

typhous, making the condition of the patient worse instead of better. A benign salivation, moreover, very seldom occurs, but in its stead the gums assume a flat and pallid aspect, with patches of white curdy deposit or epithelial slough, and at the same time eschars, terminating in ulcers, appear on the inside of the lips and cheeks. Such a result of the mercurial treatment is greatly to be deprecated, as it is not merely a sign that no good has been done, but a condition induced which may greatly increase the sufferings of the patient, and even add to his dangers by the sloughing or gangrenous tendency of the sores. The practice of giving calomel in alterant doses in the typhous fevers, has long since been renounced by myself, and very few if any of our physicians now follow it.

Calomel, when thus administered, is capable of making itself extensively and powerfully felt, but the diathesis it establishes cannot set aside the typhous diathesis, nor even afford the mitigation which so often comes from the antimonial diathesis. This might have been inferred from two facts, first, the injurious effects of a mercurial irritation in scorbutus, between which and the typhous diathesis, as we saw in the last chapter, there are some close affinities; second, the controlling power of calomel over the acute phlegmasiæ, especially those of the serous membranes, in which the diathesis is phlogistic; the opposite, in many respects, to that of the typhous fevers.

We cannot, however, entirely discard this medicine in the fevers we are now studying, for in several states and complications, there is that approach to the phlegmasiæ, which justifies or requires its administration. First, in the early stages of the cases denominated synocha or synochus, when there is a white tongue, a bounding if not tense pulse, acute pains of the head, back, or limbs, and subsultus, delirium, and coma have not set in, the impress of calomel is safe and beneficial, though it may but seldom terminate the fever. Second, if the membranes of the brain become acutely inflamed in any stage of the fever, but especially in the earlier, calomel may be freely administered. Third, the rise of an acute mucous gastritis will imperatively demand a free and repeated administration of calomel, combined with opium. Fourth, the occurrence of hepatitis will equally require an unrestricted resort to that medicine. The therapeutic principle then is, that calomel as an alterant is useful in the typhous fevers in proportion as a primary or contingent hyperinosis or phlogistic state may arise; and when we connect the good it has done in these conditions, with the benefits of its action on the biliary system, we can understand how it is that with some physicians there is a leaning towards its employment in every case.

VIII. Sudorifics.—No physician treats the fevers we are now studying without the exhibition of sudorifics. The recovery which almost invariably follows on a general warm and prolonged perspiration, has established in our minds an association of ideas between that function restored and the

restoration of the patient, which prevents our inquiring how they stand related as cause and effect. We aim as earnestly to produce the desired phenomenon, as if we actually knew that it would be the cause of what it may be only the sign,—the approaching convalescence of the patient. Passing this by, however, we may grant that the sudorific treatment has much to recommend it of both theory and results, and should therefore receive attention in every case. Nevertheless, in the stage of the fever now under consideration, we are not to administer sudorifics in the doses and with the external adjuncts which are admissible in the forming stage. A gentler and more prolonged administration is required, nor should we aim or expect to bring on a perspiration in that portion of the twenty-four hours which extends from noon to midnight, for the febrile excitement is generally greater then than from midnight to noon. It is not uncommon for a perspiration to begin on the face and upper parts of the body, and on successive days to extend gradually to the feet. This is favorable; but when it continues limited to the upper portions of the body, the prognosis is not so good, especially, as sometimes happens, if the lower extremities should lose their natural temperature.

In the early stages of the fever (which we are now especially considering), the saline and sedative sudorifics are most proper. The antimonial solution which has been named, may be regarded as one of the best; but as it is indispensable to a tangible perspiration that the bowels should be quiet, the pulvis antimonialis or ipecac. in minute doses, is, perhaps, preferable.

The former has never been extensively used in the Valley, but the latter is employed by most of our physicians. Of their comparative powers, I cannot speak from experience, having seldom employed the antimonial. When the febrile excitement is considerable, several saline substances, as the acetate, nitrate or citrate of potash may be advantageously given; the various diaphoretic infusions already mentioned should be administered as freely as the stomach will bear, and sometimes throwing all medicines aside, large draughts of cold water—should the patient crave and relish them—will effect the desired end. As a general fact opium or its preparations should be combined with our sudorifics, but its administration must be limited to the evening or early part of the night, that the *slight* narcotism which it should produce may come on in the latter part, when perspiration is most likely to occur. When opium is to be given the compound powder of ipecac., or Dover's powder, is our best preparation; but paregoric or laudanum and the wine of ipecac. may be given in a solution of the nitrate of potash, or in the ordinary camphorated mixture. The salts of morphia are preferred by some of our physicians, but I have not investigated their claims to superiority.

IX. Sulphate of Quinine.—The great value of this medicine in our periodical fevers, which sometimes terminate in secondary typhous, has led

rolling power as in unmixed periodical fever, it is so useful that
ian should not withhold it. Of what value is it in the lesions of
so often present in the typhous fevers? Analogy would suggest
rment, but I have no facts from which to draw an answer to the

ANIC, VEGETABLE ACIDS.—If I am not mistaken, patients have
nstinct towards acidulated drinks in the typhous than the phlogis-
and until delirium or coma renders them indifferent, they covet the
a of vinegar to the skin, and its vapor to the Schneiderian mem-
lungs, which they find acceptable and refreshing. Are we at
infer from this propensity that acids are salutary in these fevers?
e answers affirmatively. The most important organic acids are
, tartaric, citric, and malic, existing singly or associated, in various
ruits, as the tamarind, grape, lemon, apple, crabapple, currant,
. strawberry, blackberry, and gooseberry. It is worthy of remark,
fruits are all nutritious, grow most abundantly in the lower lati-
l ripen in summer. They seem designed, therefore, to counteract
of great external heat; and without inquiring whether they do it
ing oxygen to the blood, and thus diminishing its absorption by
, we are required by observation and experience to concede to
oling influence. They also supply carbon and hydrogen, which
fice of the lungs to eliminate in the form of carbonic acid and
t may not these elements pass off by the skin, which in hot climates
ore copiously than in cold? An increase in the sebaceous secre-
d require an increased supply of carbon and hydrogen, its chief
its. The native African is our best specimen of man as he is
r moulded by a hot climate, and he presents unequivocal proofs of
elopment of the sebaceous follicles, in the polished and greasy

their refrigerative effect; as their action on the vital properties of the solids may be and probably is of a sedative character; thus giving them additional power over the tumultuary movements of the circulation in the earlier stages of those fevers. Still further, they probably act antiseptically in and upon the blood, although the *modus operandi* may not be understood. Their preventive and curative power in scorbutus is known to all the world; and we have already traced out some important sanguineous analogies, between the scorbutic and typhous diathesis.

Of the comparative therapeutic effects of the different acids, but little is known. If any be found in particular cases to disturb the bowels more than others, they should be rejected. Those which act most on the secretions should be preferred to others. It is a popular opinion that they act on the kidneys more than the skin, but my own experience leads to the opposite conclusion. The influence of the acidulous or bitartrate of potash on the former has probably led to that conclusion, but the salt is decomposed and its alkali becomes the diuretic. Vinegar, or the acetic acid, the best for external use, is I think the least acceptable to the taste and stomach of the patient. The malic acid, not being officinal, can only be had in practice by macerating the fruits which contain it, when other substances, irritating to the bowels, may be extracted. The citric and tartaric acids, are most available, and every typhous patient should be supplied, *ad libitum*, with lemonade or tartarade, not made very sweet. In hospital practice I have found the latter cheap and convenient. The vegetable jellies, consisting of one or more of the acids in combination with the pectic, are eligible preparations, and when the stomach of the patient is oppressed by the fluids taken, they may be swallowed in their semi-solid form; which leads me to say that the various acido-saccharine fruits, when perfectly ripe, may in some cases be preferable to their insulated acids. In the treatment of the phlegmasiæ this would not be the case; but an ample experience has shown, that except in the beginning of the most inflammatory forms of typhous, a certain amount of nutriment should be daily administered. Great care should be taken, however, that the integuments, seeds, and other indigestible parts should not be swallowed, as they might irritate the stomach and bowels.

The use of certain medicines will render a liberal administration of the vegetable acids improper. Thus, about the time of the operation of an emetic or cathartic, or during an alterant course of tartarized antimony or calomel, they should be given sparingly; with sudorifics, however, they may be exhibited freely, but the water in which they are dissolved should not be cold.

XI. Cold and Tepid Effusion.—Although I have referred to the external application of water when speaking of the hygienic and expectant treatment, I must return to it here. Of its decided value in the treatment

ixty degrees, will often arouse and give him a natural expression. den and decided impression on the nerves of the skin changes the his innervation generally. It must be remembered, however, that d water may be followed by a reaction that is not desirable in the the fever we are now studying. The object is to carry off the ndant heat, and moderate the morbid activity of the calorific func- ich will best be effected by water that barely feels cold. The higher perature, and the more intense the febrile action, the higher should armth of the water, and the longer its application. If it be raised inetieth degree, it will still, by perseverance, effect the object for is employed, without the risk of reaction. It is during the stage functional disorder, with *simple* congestions, that the general laving on is most beneficial. I even doubt the propriety of applying *cold* the general surface after active inflammation has become established reat organ.

ich an inflammation the topical application of water is one of our best s. I see no objection to its use when the inflammation is seated in s, provided its temperature be subtepid or cool, but I have not em- t. When the inflammation is established in the brain, and often s I presume, there is congestion only, its application to the head is, l know, nearly universal. For this purpose it is sometimes iced, n ice itself is not unfrequently used, but we may well doubt the y of such a practice. It is, in my own opinion, far better to take the temperature of 60° or 70°. Its continued and skilful appli- ill at length produce a decided effect, and reaction will not follow. it effect, it must not be applied by placing a wet and many-folded the crown of the head, as I have seen even physicians do, while eldom think of any other. If a fabric be employed at all, a coarse g is the best, which should never be doubled, should cover the

come on, it may be necessary to continue for many successive hours, or even days, the body of the patient should be kept well though not oppressively covered, and measures be adopted to keep the feet warm. When the brain is inflamed they are apt to become cold, a fact which suggests that the maintenance of their temperature may diminish that of the head. To accomplish this object they may be placed for a brief period in iced water, and then immersed in a hot and stimulating bath, after which they should be briskly rubbed with the warm naked hand of a nurse, and then wrapped together in a soft blanket. The heat will be better retained when they are in contact, than when they are separated by woollen socks. If these rules be neglected in cerebral typhus, the resort to water will do little good; but faithfully and perseveringly observed, great benefits may be obtained.

In abdominal typhus, when there is decided heat of the parietes, with morbid sensibility or tenderness under percussion, whether in the right iliac region, or over a greater area, when a certain degree of fulness exists, and pressure creates borborygmi, whether diarrhœa be present or not, the application of water to the abdomen is one of the very best. It may fall in a stream, the patient being laid on an India-rubber sheet, or be applied in the other modes just pointed out; or when their weight is not oppressive, in the form of large, emollient, subtepid cataplasms, frequently renewed, as was practised by Dr. Gordon. A valuable modification of this practice is to cover the whole anterior and lateral parts of the abdomen with several soft towels, thoroughly and separately wetted in subtepid water, and applied lightly over each other, so as to be partially separated by atmospheric air; the whole to be covered with oil or varnished silk, so as to confine the vapor. In making these applications, it should be recollected that the spleen is often undergoing a disorganization in these fevers, which might perhaps be retarded by carrying the water over the left hypochondrium. It should also be borne in mind that the liver, not less than the alimentary membrane, may be the seat of a congestion or inflammation which might be mitigated by slightly acidulating the water with nitro-muriatic acid. In conclusion, I must recognize the rule originally laid down by Dr. Currie, not to continue the application of water, either general or local, after chilliness supervenes.

From the earliest settlement of the Interior Valley, its physicians have had to grapple with—quite too often yield to—the prejudices of the people against the general application of water to the surface in fevers, especially its affusion, which in many cases is the only mode that the resources of the sick-room will permit. This prejudice, which evidently had its origin in the erroneous pathology and still more erroneous therapeutics of our predecessors, was greater formerly than at present. In this city, during the epidemic typhous constitution already described, which continued from 1809 to 1813, or longer, the popular objection to the cold affusion was decided. During that period, the author first saw the classical work of

mind; and if hydropathy should continue in vogue long enough to
e the fears of the people in regard to the application of water in
t will do something to compensate for the injury it has done, by
sive application of that fluid in diseases to which it was not adapted.

BLISTERS.—Counter-irritation with blisters should not be made to
moderate the fever, but to relieve particular organs. The former
t accomplish, but the latter is within its reach. Blisters should
a first remedy if the febrile excitement run high, as it is well
that they will then torment the patient without conferring any
and may even aggravate the fever. The limitation of their use is,
better understood in the Interior Valley now than in former times.
hey are applied it is for the relief of inflammation; but a common
evails by which their benefits are diminished,—they are kept back
. To be effective, they should be applied while the inflammation
n its forming stage. Up to the time of its full establishment, the
of the organ may be said to be merely functional, but after morbid
n of the lymphatic or purulent kind has commenced, the counter-
n cannot be expected to effect a resolution of the inflammation.
the inflammation is seated in the brain, it is the common practice
the first blisters to the ankles; but as there is always a possibility
rene in the typhous fevers, it is more proper to apply them to the
of the thighs. The next is generally applied to the nucha and
and I can see no reason why the first should not be there. The
cerebral typhous) is to the scalp, which is generally deferred to so
tage of the fever as to be useless. This postponement till the death
patient is at hand, has established in the minds of many people a
ssociation of ideas, which interferes with the blistering of the head
tage of the fever. Having seen death follow soon after the applica-

poultice over the unremoved cuticle is far better, and should be continued until a new cuticle is formed, or for several days, when, if found to interfere with that reproduction, the surface may be covered with collodion, and lint or batted cotton applied after the collodion has dried. Under such dressings the nervous system will be less disturbed, and the amount of revulsion much greater than when unguents of an irritating quality are applied. If, however, as sometimes happens, effusion should occur without any sustained hyperæmia of the surface, which may look white, the addition of honey to a *hot* poultice will speedily bring about a proper action in the capillary vessels.

Sinapisms, often beneficial in the advanced stages, are not equal to blisters in the early, and should not be employed except to the soles, when the feet, in affections of the brain, continue to become cold.

XIII. Conclusion.—We have now travelled over the treatment appropriate to the early *stadia* of the typhous fevers. Of course every suggested, or even every employed remedy has not been considered; for, as in the treatment of other diseases which refuse to be arrested, a multitude of measures have been invented or employed. Yet the means on which the physicians of this, and, perhaps, most other countries have placed the greatest reliance, have been set forth, and my own humble judgment of their *modus operandi* and comparative value honestly expressed. No one will suppose that the whole are to be employed in any single case; nor, still less, that any case is to be intrusted to the efficacy of a *single* remedy. For every patient the physician must make his selections, and from day to day his new combinations, according to the general indications, and the seat of the varying local affections.

There are but few diseases the cure of which can be confided to a single remedy. Goitre, scrofula, scurvy, and syphilis, are the best examples of this kind; but even these often require auxiliaries, in addition to their respective remedies; our periodical fevers cannot be met with quinine alone, and the phlegmasiæ, still simpler in pathological elements, require concert of remedial action. The plan adopted by the celebrated Louis, and other distinguished Parisian physicians, of trying the effects of different remedies, apart from others, in the treatment of complex pathological conditions, seems to be as unphilosophical as it has proved unsuccessful; it does not even do justice to the single remedy, for while it might, if employed at the proper time, in a system of measures, accomplish an important end, it is as likely to prove powerless without their assistance. I am obliged, therefore, to reject the conclusions drawn from such modes of estimating the value of different remedial agents in the fevers we are now studying. The lancet, cups, a blister, an emetic, calomel, a cathartic, a sudorific, laudanum, and cold water, might each fulfil some obvious indication in such a fever, and be in reference to that the very best, while the preservation of the life of the patient resulted from the concurrent action of the whole. In such a

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ave been obliged
out learning that
restrain the action of
f the whole is far more

nture to express the opinion
ed to what is called the nume-
work on typhoid fever, by the
ologist just quoted. In the first
hospitals, superintended by resident
se and decline of every symptom, and
ription, in the absence of the principal
h never can be extensively or accurately
. Secondly, no two typhous epidemics present
ptoms and lesions, although their diatheses and
atment may be nearly or quite identical; and,
arrive at a final conclusion as to the order or com-
different local affections. Thirdly, nor is this neces-
that the brain, the lungs, the spleen, the stomach, the
are liable to be implicated, and are thereby instructed to
gilantly, it can be of no practical value to know precisely
frequency; as, for example, that in a given number of cases,
present an affection of the lungs, and one-third an affection of
. A knowledge of their comparative liability will not establish
tence of either in any particular case. Fourthly, the symptoms and
are modified by the treatment. Some are mitigated or removed;
there may be aggravated or prolonged; and hence two cases, which, left to
themselves, might have presented the same concourse of symptoms and the
same lesions after death, may, under the influence of different modes of
treatment, show many divergencies in their progress. Fifthly, the numerical
method, followed for an indefinite length of time, does not give us a final
and reliable conclusion; for all the cases of the disease to which it is ap-
plied, that ever have occurred and ever will occur, belong to the data
necessary to such a deduction, which, being thus made, would express with
mathematical accuracy a certain portion of its history, though it might give
us no more assistance in the treatment than an approximative estimate.

Thus I cannot concede that observations not made on the numerical
method are of no practical value. On the contrary, I attach importance to

the conclusions, at which acute and observing men have arrived, under the daily and reiterated impressions made on their minds in the practice of their profession. Our diagnosis and therapeutics have been constructed on materials thus collected; and will continue to be improved and perfected in the same manner. The numerical method may throw its exacter contributions into the great volume of data, but will never exclude those collected in a different mode.

SECTION V.

TREATMENT OF THE MORE ADVANCED AND FINAL STAGES OF THE TYPHOUS FEVERS.

I. No line of demarcation can be drawn between the stage through which we have passed, and that on which we are now entering; for no sudden change in the phenomena, like those which characterize the successive stages of small-pox, occur in these fevers. Yet in their progress some of the earlier disappear or are greatly modified, and new ones progressively arise which continue to the end. Hence if we compare two cases in the earlier or the later periods, they may resemble each other closely; but the different stages do not. As to the time of culmination or change, nothing can be more indefinite; for in some cases, the primary symptoms degenerate into or are blended with the supervening symptoms of the final stage within a few days, in other cases not till a far longer time has elapsed. But what are the symptoms which characterize the earlier and later stadia of these fevers? I may say in general terms that a white tongue, sustained and general heat of the surface, a bounding and sometimes firm pulse, with pains more or less acute, and a comparatively active state of the intellect and senses, may be taken as characteristic of the earlier stages; while a change in the tongue to a dry and dark surface, a failure in the energy, with increased frequency, of the pulse, a depressed state of the mental faculties, blunted sensibility, drowsiness, subsultus tendinum, and depraved secretions express the more advanced periods; the transition being in some cases rather sudden, but in general so gradual that no actual beginning is observed.

Now the treatment which has been laid down is applicable to the former period, but not to it only; for much of it applies to the latter, in which some things may be done with more, others with less energy, than in the earlier periods.

II. As a general fact, the progress of the fever demands a more limited employment of whatever enfeebles the system. Hence, venesection is no longer admissible except, perhaps, in an occasional case of acute cerebral or pulmonary inflammation, when the typhous diathesis is not highly developed. Topical bleeding, however, is still not only admissible, but often

nsable, for the subdual of inflammation in the organs just mentioned, nucous membrane of the stomach, the glands of the ileum, the liver, ubtless in the spleen. The degree to which it may be carried, must ded in every case by the intensity of the symptoms and its effect on ength of the patient. The length of time after the commencement reaction beyond which local bleeding is inadmissible, cannot be de- ed, for according to the rapidity of the disease it may be only a few as many weeks. The strength of the heart, of the muscles of loco- , are exponent of the energy of the brain; and the presence or ab- of a petechial or hemorrhagic tendency, must guide us in this de- When the exhaustion has reached a certain point, which must be of by the physician, local bleeding is no longer admissible, what- ay seem to be the state of the suffering organ; and yet this rule be taken in the absolute, for we must exclude from it certain cases t standing, in which the failure of strength results in part at least ie engorgement of the brain or lungs.

Vomiting may sometimes be serviceable in this stage, even to a late ; but tartarized antimony is longer admissible, and the best formula ted infusion of mustard, administered in such quantities as to operate ly, and not debilitate by protracted nausea. I shall not repeat what en already said on the *modus agendi* of this class of medicines; but at an important benefit from vomiting in this stage of the fever, is reased perceptibility of the stomach to the impress of food and tonics imulants, now become an important part of the treatment. The h is one of the four great organs which in different ways influence ole. The brain elaborates and sends through the organism its pecu- fluence; the lungs rid the blood of its superabundant carbon and im- with oxygen; the heart keeps it in circulation; one mission of the h is to radiate excitement, raised in itself by the action of external received into it. To whatever extent they may be absorbed and it to act on the internal surface of the arteries, there is I think ant evidence that they make a primary, and according to the dose and , powerful impress on the stomach, which through the nerves is trans- to the heart and brain. If the agents be healthy excitants or stimuli, rgans are normally excited, and performing their functions with in- l activity, the whole organism is raised into higher excitement. Such ne of the great offices of the stomach, which it performs in virtue of sibility and contractility, we may be sure that when they fail in the s of a typhous fever, the means which experience has shown to be ry to the maintainance of the strength and activity of all the organs, l short of the full effect—and may, indeed, be administered without neficial result. Thus it is that we find one reason for occasional g, even when the fever is far advanced. But there is still another. ngs in that stage are sometimes deeply engorged, and local bleeding

is no longer effective; but free vomiting often gives great relief. The capillary system is quickened into contraction, and empties itself. This mode of relief must not be confounded with that in pneumonia, from the liberal administration of the great contra-stimulant, tartar emetic, which would now be too debilitating.

IV. Purging, which in the beginning must not be carried very far, in the latter period of the disease, can never be excited without danger. Constipation is then auspicious, unless there should be inflammation of the brain; yet it should not be allowed to continue indefinitely. It may in general be obviated by stimulating enemata, such, for example, as watery infusion of assafœtida, with oil of turpentine, and sugar or honey. Of aperients by the mouth, the following pill is one of the best:—

℞.—Blue Mass, Rhubarb, Assafœtida, and Extract of Hyoscyamus, of each, equal parts, beat into a mass with rectified Oil of Amber. One or two four-grain pills will generally be sufficient.

Another laxative appropriate to this stage, is the tincture of rhubarb and gentian, of our pharmacopœias, administered in drachm or two-drachm doses.

Whatever is administered, should have its operation restrained within moderate limits by the use of laudanum; and when the strength of the patient is greatly reduced, he should be required to use the bed-pan. Calomel, in minute doses, may be substituted for the blue pill, but should not be often repeated, and never administered, as in the earlier stages, for the purpose of exciting salivation.

V. In the latter stages of the fever, the physician should still endeavor to bring on perspiration, but must employ only the most stimulating sudorifics. The antimonials are no longer admissible, except in minute doses, combined with excitants, and then they should be limited to cases unaccompanied with diarrhœa. The infusion of serpentaria or eupatorium is now valuable. The spiritus Mindereri with an excess of the carbonate of ammonia, may be made the vehicle of other diaphoretics, as the wine of ipecacuanha and paregoric, or one of the preparations of morphia. Pills of equal parts of Dover's powder and camphor, in connection with hot wine whey often afford satisfactory results. Should no diaphoresis ensue, but the pulse become more frequent and the heat of the surface increase, pellets of ice, or draughts of cold water, which before such medicines had been administered, would have been too refrigerating, may now prove refreshing and bring on a sweat. In such cases attention must be given to the heat of the lower extremities, as the skin is one organ, and if a portion of it be cold, the remainder can with difficulty be brought into perspiratory action.

VI. Water is still of use, therapeutically, in the more advanced stages of the fever. As long as reaction will follow on the sudden affusion of that which is decidedly cold, it may be advantageously applied as a general in-

stage, to inflammation, and say that the patient dies of that local
, and this is doubtless true in many cases; but from the absence of
es of inflammation of the brain, in so large a number of autopsies,
take another view, and conjecture that the preternatural heat
head in the declining stage of these fevers may sometimes be an
of what is denominated the *vis medicatrix*. The vital energies
ate themselves in the brain, as the troops of a besieged fortress
n its citadel when they have become too few to man and defend the
ted outworks. According to this hypothesis it is possible that the
he patient is sometimes prolonged by the very condition which we
s the chief cause of his death. If I am not mistaken, we see this
ed in death from starvation. Dissection has often revealed in such
ngestions of the brain and stomach. Now the former develops and
roughout the organism, a sustaining influence (I can use no more
expression), and the latter, as we have seen, is an organ which
ietically excites the rest. Thus physiology suggests that if our
n be endowed with a principle of self-preservation, the capillary ex-
t will, under starvation, make its last rally in the two organs just
The practical deduction from this speculation is, that we may some-
jure our patients in the closing stage of typhous fever, by over-
refrigeration of the head.

a curious fact, that the negro, who is intolerant of cold, has an
which leads him to protect his head, rather than his feet. It is
wn in the northern slave-holding states, that in cold nights he is
sleep with the crown of his head near to the fire, and his feet ex-
n his own theory that the head must be kept warm. With this
and the assigned reason, the author was familiar, before visiting
in 1847, but while there, he met with Dr. John Campbell, of the
Army who gave him the following. During the siege of New

caloric, with which the head is supplied, coincides with the African philosophy, and our own habits in winter, go to strengthen the same conclusion. for the individual may have his feet frostbitten, without any great or immediate enfeeblement or failure, but he suffers severely, if he allow his head to become chilled. A high and sustained temperature of the brain seems, indeed, to be indispensable to its successful working.

VII. In the latter stadia of the fever, blisters should be used with great reserve, as the denuded surfaces are prone to gangrene; and though *this* may not occasion the death of the patient, his friends are not likely to take that view of the matter. For the relief of local affections, and as general stimulants, rubefacients, cataplasms, and lotions, which do not detach the cuticle, and produce a deeper and more sustained hyperæmia, are greatly to be preferred. The most convenient and efficacious articles are mustard, capsicum, oil of turpentine, and ammonia, the last in the form of Granville's lotion, or the compound liniment of the pharmacopœia. The first is the most enduring, the last most speedy and transient in its effects, and therefore adapted chiefly to sudden failures of the vital energy. The insensibility of the patient will in many cases prevent his complaining of the sinapism, but that should not lead to its being kept on the same place for more than a single hour, for if kept longer, gangrene may follow. To be effective, turpentine should be applied warm, and if saturated with camphor, its effects will be still better.

VIII. The vegetable acids, so beneficial, or at least acceptable, in the more acute stages of the fever, are now too refrigerant and sedative; but the mineral are not liable to that objection, as experience has placed them in the class of tonics. Which of the four—sulphuric, muriatic, nitric, or phosphoric—should be preferred, cannot in the present state of our knowledge be decided. These acids quench thirst, and seem therefore to have an anti-febrile power; at the same time they exert a tonic influence by which they may favor the restoration of appetite, and perhaps improve the vital cohesion of the capillaries, thereby contributing to the prevention of hemorrhage. Of their effects on the blood it is impossible to speak either definitely or definitively, but from the analogies between the state of that fluid in scurvy and in the latter periods of many cases of typhous fever, we may, perhaps, assume, that a part of the benefit which they afford, is directly due to their influence on that fluid.

To give energy to the stomach and restore the appetite, the sulphuric, in the form of elixir of vitriol, is perhaps preferable. It is, I think, the best tonic of the whole. When it disturbs the bowels, the addition of an equal or greater quantity of paregoric will, generally, restrain it.

Should there be much hepatic derangement, the nitric acid should receive a preference, from its action on the liver. It has been proposed, however, to use this acid for the purpose of controlling the fever, in cases not attended with hepatic disorder.

As neither sulphate nor nitrate exist in the blood, while the muriate of
la and potash constitute its most important saline elements, we are at
erty to suppose that muriatic acid finds a readier admission into the blood-
sels than either of the others, and is more likely to exert an influence on
it fluid than they. We know not how it may act, but if there be any
lity in the old opinion of an incipient putrefactive decomposition of that
id in certain cases of typhus, there may be a development of ammonia,
a neutralization of which the acid would be fitly adapted. We know
at in the advanced stages of typhus, the blood coagulates very imperfectly,
d it may be from its correcting that diseased condition that the muriatic
d is a good anti-hemorrhagic in those fevers. Whatever be its mode of
ration, I have found it beneficial.

Phosphoric acid has not, I think, been used in this country. It has been
ployed in Germany and regarded as a general tonic and mild stimulant.
s presence in the blood and the presence of phosphorus in the healthy
ain, which is greatest during the most active era in the existence of that
gan, would seem to warrant the expectation that this acid would be found
eful in the weak and degraded condition of the nervous system which so
inently characterizes the latter stages of typhus.

Astringents.—Two pathological events demand the use of astringents,—
rrhœa and hemorrhage.

a. The diarrhœa in continued fever may depend on one or more of the
ee following pathological conditions: morbid secretions reacting on the
sels, morbid contractility, and inflammation or ulceration of the glands
the ileum. When the conditions producing it are removed, it of course
ses, but such a cure is not often practicable, for those conditions being
rts of the general pathological state which constitutes the fever, may be
ractable—meanwhile the continued excretion may rapidly exhaust the
tient, and signally interfere with the effects of medicines given to act on
e skin, lungs, or kidneys, and should therefore be checked. Various
ans of restraint have been already referred to, but I must here add a
ragraph on astringents proper.

1. Tannin, or more correctly tannic acid, may be regarded as *the* vegetable
tringent. Separated from every other element of the astringent plants, it is
e of the most convenient and powerful of our means for restraining diar-
œa. When much fever is present, it may be combined with ipecac.* in
e proportion of four grains to one; or with Dover's powder in equal pro-
rtions. Thus while the secretions and excretions from the mucous mem-
ane are restrained, those of the skin will be promoted. It may, also, be
ven in pills with blue mass and opium, in the proportion of three grains
the first, one of the second, and a fourth of a grain of the third. It

*[Ipecacuanha is incompatible with any vegetable astringent containing tannic acid, which is its
ural antidote.—Ed.]

may likewise be administered in the liquid form, of which the tincture galls is a good preparation.

2. Kino, one of the astringents which I have oftenest employed, and which is I think in most general use, may be administered in pills with opium, in the proportion of five grains to one-fourth of a grain; but the ethereal tincture is more generally used with the chalk mixture, in the proportion of a drachm to the ounce, with or without laudanum.

3. It would be waste of time to name all the vegetable astringents, *but* I must not pass over our indigenous *Geranium maculatum*, or crow-foot. I have been long accustomed to employ the root of this plant boiled in sweet milk and strained. A strong decoction of this kind is a powerful astringent, which lies well on the stomach, and soothes while it restrains the action of the bowels. An ounce is the proper dose, frequently repeated.

4. Of mineral astringents, the carbonate of lime, and lime itself, although not potent, are in general and perhaps deserved use. The hydrargyrum cum creta, not limited to cases accompanied by diarrhœa, is almost invariably employed by our physicians, when they suspect an affection of the Peyerian glands. In large doses it may act on the bowels, in virtue of the mercury, which although but mechanically divided in the mixture, is brought into a condition to absorb oxygen, and become a protoxide in the bowels. Hence the union of Dover's powder on small doses of opium, is often required. The chalk mixture already mentioned, is also a favorite prescription, but is generally given in doses too small. It is a good vehicle for the vegetable astringents, and the tincture of opium. Lime water is often beneficial, and may be given alone or in combination with boiled milk or an infusion of the bark. All the cretaceous preparations are especially proper when the excretions are acid.

5. Of metallic astringents one of the most convenient and reliable is the acetate of lead. When there is much fever, with evidences of intestinal inflammation, its solution in vinegar should be preferred. One scruple to the ounce is a good proportion, the dose of which may be a teaspoonful. It is, however, more commonly given in substance, alone or combined with ipecac. or opium or both. The dose may then be from two to five grains. In giving this easily decomposed medicine we should withhold the chalk and lime water, the sulphates, muriates, and even draughts of hard water, as incompatible.

B. Hemorrhages in the early stage of typhous fever, generally from the nose, seem to depend entirely on congestion—in the advanced stages on congestion, diminished vital cohesion, and liquefaction of the blood. The acidulated astringents are most successful in their arrest. Thus tannin may be administered in claret, as pointed out in treating of yellow fever; the acid solution of sugar of lead is preferable to that salt in substance; the aromatic sulphuric acid with double its quantity of paregoric, in 30-drop doses, is now valuable; and the acid sulphate of alumen and potash or common alum,

ıay be administered with much confidence; but the salt of lead must not e administered at the same time with the two latter prescriptions; nor the um at the same time with the tannic acid. Alum may be administered powder with an equal quantity of white sugar, with every scruple dose which a quarter or half a grain of finely powdered opium, or an eighth a grain of sulphate of morphia may be advantageously mixed.

To these active agents I must add creasote, which I have not myself emoyed in the cases under consideration, but am assured by Dr. Sowell of labama,* that he has employed it with very great success.

The agents we have reviewed should not be restricted to cases of actual emorrhage; but given freely whenever extensive petechiæ or vibices, disose the existence of a hemorrhagic diathesis.

IX. The vegetable tonics have long been standing remedies in the declinag stages of the typhous fevers. It may be doubted whether the good hey have done has contributed more to their continued use than the instinct or feeling which prompts us to administer stengtheners, when we see he strength of a patient wasting away. All the officinal bitter tonics have been prescribed in cases of this kind. They are good vechicles for the mineral acids.

It is often useful to add some aromatic stimulant, such as cardamom. The infusion of gentian and orange is a simple bitter which generally lies well on the stomach. When diarrhœa, with lesion of the glands of the ileum, prevails, the cold infusion of wild cherry bark (*Prunus Virginiana*), made by displacement, is appropriate, and under the same pathological circumstance, the infusion of calumbo root, prepared in the same manner, is still more valuable, from the presence of gum and starch.

Early in the present century an opinion spread over the West that the root of the *Frasera Walteri*, a stately and beautiful plant of the woodlands and prairies, was the identical "calumbo" of the shops; and it was immediately made to some extent an article of commerce. As the plant furnishing the officinal root was not then known, the identity or diversity could only be determined by a pharmaceutical examination. This led the author, in 1809, to institute a series of comparative experiments, that proved them to be from different plants, which the researches of the botanists have since confirmed. The results of this examination were published the next year;† but that which began as an honest, though hasty conclusion, was continued as a fraud, and there can be little doubt that much of the officinal calumbo, for a long time after, if not down to the present time, has been adulterated with the Frasera. This adulteration, according to Pereira, even made its way to France. The Frasera root is a good bitter tonic, but has never been extensively used by our physicians.

To enumerate all the vegetable tonics which have been employed in typhous fever would be a waste of time, and I shall conclude with a refe-

* Letter of August 1st, 1851. † Notices Concerning Cincinnati, 1810, p. 61.

ark and its preparations. Before the discovery which re- reparation of the salts of quinine, the bark was very gene- in our typhous fevers, as it was in Europe. Its control over , suggested, perhaps, that it would be efficient in the continued former times, I gave it a thorough trial, but with no other n the conclusion of its being the best of our vegetable tonics. t seem to possess the power of shortening those fevers in the , as we have seen the sulphate of quinine does not of arresting e former. Its greatest power is manifest when it is made into ry with camphor and finely powdered opium, the tincture of cin- r some other aromatic being used to form the pultaceous mass. owever, more commonly given in the form of infusion, or decoction, rpentaria. When diarrhœa is present, such a preparation may be geously combined with an equal quantity of lime-water. I have nployed the compound, or Huxham tincture, and in cases which nd a stimulant it may be preferred.

Of the sulphate of quinine I have already spoken. In the latter stages, when an efficient tonic is required, it is less reliable than the bark; but being more acceptable to the stomach in certain cases, may, in such, be preferred. Small doses, as, for example, a grain, or at most two grains, every two hours, will be best. It may be given with elixir of vitriol in acid solution, to which a minute quantity of sulphate of morphine may be added, or in the form of pills, combined with camphor and opium. To such a compound, the addition of ipecacuanha, in subnauseating doses, will sometimes impart a diaphoretic property, and procure rest with gentle perspiration.

It seems almost unnecessary to add that if a decided inflammation of any organ should exist, however advanced the stage of the fever, or great the debility of the patient, the vegetable tonics are contraindicated.

SECTION VI.

TREATMENT IN THE FINAL STAGES CONTINUED.

It would be tiresome even to call over the catalogue of local, diffusible, narcotic, and antispasmodic stimulants, derived from all the kingdoms of nature, which have been administered in the declining or closing stages of continued fever. Their great number may well raise a suspicion of their efficacy. That they have often done harm by being administered when inflammation, especially of the brain, was present, cannot be doubted, hence the deep importance of the symptoms by which inflammation may distinguished from irritation and exhaustion. After commencing th administration, however, we may generally judge of its propriety by their

on the circulation. If they were truly indicated, the pulse will be-
slower and fuller; if it should become more frequent, they should be
tinued. Again, they have done harm by being exhibited in excessive
ities; and, on the other hand, they have failed from a timid adminis-
. Still further, their benefits have sometimes been diminished by
a single one too long; for while the effects of some medicines, as tar-
antimony, digitalis, arsenic, and calomel, are cumulative, that is,
roduce a state of the system which gives to the subsequent greater
ncy than the former doses, the medicines we are now studying lose
power by repetition, which renders augmented doses, or a change of
s necessary. In enumerating the principal stimulants, I will begin
ne which is, perhaps, much more local than general, and would pro-
have been as much in place, when treating on the cure of the first
of the fever, as here.

The tincture of cantharides has been employed in a typhous fever of
sippi with success. Dr. Robert E. Lanier, of Columbus, in that
informs me that he has used it for several years, with a success that
ven him great confidence in its efficacy. He administers it in every
of the disease. His dose is five drops of the officinal tincture every
ours, suspending it on the occurrence, and during the continuance of
nary. It frequently operates as a diuretic. It has never failed to
e the dryness and otherwise improve the appearance of the tongue.
ever gradually abates under its use.

tharides is more of a local than a general stimulant. It acts espe-
on the mucous membranes of the digestive and urinary passages, and
able of making a powerful stimulant or phlogistic impression on those
es without much exciting the heart. In large doses, however, its
reaches the brain, producing coma. I can see no reason, *a priori*,
such an agent might not prove a valuable alterant or counter-irritant
phous fevers.

Oil of turpentine, which, in its action on the skin and mucous mem-
s, somewhat resembles cantharides, has long been employed in typhous
, and its use in the Interior Valley is universal—not in every case,
every part of the country. It is regarded as exerting its influence
y on the alimentary membrane, superseding incipient inflammation,
ing the progress of glandular lesions in the ileum, promoting the
of the bowels, when aperients are necessary, without occasioning
catharsis or increased debility, and, above all, exciting those peri-
actions which effect the expulsion of flatus, and avert or remove
nitis. It has also been found beneficial in hemorrhage from the
s. It excites the pulse more than the tincture of cantharides, but
scarcely be ranked with the stronger constitutional stimulants. Its
tion, an admitted fact, and its action on the kidneys, skin, and lungs,

* Letter dated May 5th, 1851.

timulating secernent, suggest that it may confer benefits in the fevers re now considering in other modes than by impressing the mucous ane of the stomach and bowels, and as in large doses it is capable of ng the condition of the nervous centres, a part of its good effects may result from its alterant influence on the morbid innervation. On ...le, it may be regarded as one of our valuable therapeutic agents in anced stages of abdominal typhus. It may be administered in doses of twenty, forty, or sixty drops, every two or four hours, in a spoonful of wine, or absorbed by finely pulverized sugar.

3. Tincture of Guaiacum. I am not aware that this medicine has been used in the latter stages of typhous fevers, but am disposed to invite attention to it. More exciting t... lation than turpentine, it has with that medicine some pharmac... herapeutic relations. Its direct influence on the mucous membrane, ... nown efficacy as an alterant, and its action under some circumstances as ... iuretic, but, more generally, a diaphoretic of sustained power, se... ggest that when we would support the energies of the heart and b... at the same time act on the capillary system, secernent and non... t, this medicine might be advantageously given. The medium ... ht be twenty drops every two hours, in wine or milk; and when dia... present, the latter should be boiled.

4. Camphor excites the ... the organs of secretion less than guaiacum, but acts with greater e... n the nervous system, in which it raises a temporary excitement, without implicating the organs of circulation to any great extent. In a morbid frequency of the pulse not depending on inflammation, a diminution may take place during its employment, apparently from a diminution of the contractility of the heart. The long sustained use of camphor in the typhous fevers must be received as conclusive proof of its utility. Its benefits seem to be conferred on the nervous system, and are most obvious in sudden failures of the nervous function in the latter stages of the fever. Most of our physicians testify to its power in similar cases, though few of them give it in the doses recommended by our Canadian brethren in imitation of Hildenbrand. In the administration of any nervine in the typhous fevers, it is advantageous to determine its action on some secretory organ. To this end nitrate of potash and sugar may be triturated with camphor previously moistened with alcohol, and administered in the form of powder; or it may be given in suspension according to the following formula:—

R.—Camphor moistened with alcohol, ʒj.
Gum Arabic, ʒij.
Triturate together and add, gradually,
Water, ℥vii.
Spirit of nitrous ether, ℥j.

Half an ounce may be administered, after agitating the vial, every two hours or oftener.

additions will determine the action of the medicine upon the kid-
But an action on the skin is more important than on the kidneys,
his end Dover's powder may be substituted for the nitre, in half
ntity of the camphor; the wine of ipecac. and paregoric, in equal
es, may replace the spirit of nitre in the second recipe. In low de-
without cerebral inflammation, in subsultus tendinum, and hiccough,
er forms of muscular debility and spasm, camphor manifests its
power. If, however, I were to rely on my own experience, I would
the beneficial effects of camphor in the typhous fever have been
d, or at least that its effects have been very unequal in cases appa-
he same.

alerian has been used in the latter stages of typhus, but it is un-
nd variable in its effects. Its infusion, prepared by displacement,
wever, be substituted for water in the camphor mixture just de-

lphuric ether, is certainly a nervine of considerable power; but its
ry effect, and the difficulty of administering it to typhous patients
tter stage of the fever, are objections to its use.

former times, I was accustomed to prescribe musk, as a nervine
spasmodic for the correction of certain symptoms in the advanced
f the typhous fevers, but found the results of its administration too
to justify the practice. In many cases it was no doubt adultera-
d when genuine its price is too high for general practice.

safœtida I regard as superior to musk as a sustainer of the nervous
of animal life, and a quieter of the ataxic and spasmodic movements
nuscular. Its effects, moreover, are not confined to the cerebro-
erves, for it allays spasmodic action and promotes the expulsion of
rom the alimentary canal; excites the heart, and combined with
ents, may determine its action on the secretory apparatus of the
l lungs. As an antispasmodic in the typhous fevers, its powers
those of opium while its narcotic properties are very feeble. It
erefore, be administered in states of the brain which contraindicate
of that soporific. When such contraindication does not exist, opium
combined with it, in the proportion of one-fourth of a grain to four
rains of assafœtida, and administered every two or four hours, with
dvantage. An equal quantity of camphor added to the formula,
whole made into a soft bolus, will, perhaps, give as genial a sup-
the innervation, in the absence of cerebritis, as any agents known

e diarrhœa of the latter stages, thick injections of starch, prepared
trong watery infusion of assafœtida and opium, instead of water,
eficial.

mmonia and its sesqui- or subcarbonate, especially the latter, are in
use throughout our Valley in the advanced stages of typhus. They

are both local and general stimulants, but their effects on the organism at large are much more transient than upon the surface to which they are applied, and which they can speedily irritate into inflammation. The carbonate is generally employed. It is frequently administered to relieve a suddenly developed subsultus tendinum; but more commonly to arrest the sinking energies of the heart and capillaries, especially those of the skin and lungs, and hence it is common to give hot wine whey at the same time. As the milk employed for this purpose is sometimes sour, and all our wines are acid, the probability is, that in many cases much of the carbonate is decomposed, forming the lactate, acetate, tartrate, or malate of ammonia, or several of them. This, however, can do no harm, provided the carbonate be administered in liberal quantities; on the contrary these salts, readily taken into the circulation, probably excite the action of the secretory organs, and thus enlarge the sphere of benefits. This perhaps is the true reason why wine whey rather than any diaphoretic infusion has become associated with the carbonate of ammonia in our prescriptions. If gastritis or cerebritis be present, the carbonate of ammonia is contraindicated. Experience has shown, however, that in the pneumonia of these fevers it may be administered freely, and often contributes to the resolution of the inflammation, and causes increased secretion from the bronchial membrane. Thus it comes to the relief of the patient, when from his debility and low degree of inflammatory action, with suffocation, tartarized antimony and cupping would be injurious, and blistering ineffective.

Hemorrhagic tendency, with that dissolved and deteriorated blood which we know to be a reality, and to which our predecessors applied the epithet putrescent, contraindicates a large and continued use of the carbonate of ammonia, as that medicine, not less than the fixed alkalies, tends to the production of such a state, with softening of the solid tissues, thus increasing the danger of hemorrhage. Moreover, if there be a reality in the old speculation of putrescency, one of the first effects of sanguineous decomposition may be the development of ammonia in the blood.

Our prescriptions are sometimes so managed, that much of what is taken by the patient has, by the escape of ammonia, been brought to the condition of neutral carbonate or bicarbonate, when, as a stimulant, its activity is greatly reduced. In cases, then, which are trusted to the exciting power of this medicine, the prescription should be put up afresh two or three times in the twenty-four hours.

10. Under the head, Mineral Acids, reference was made to the phosphoric as a tonic which contained one of the elements of the brain—phosphorus. That element belongs to the class of energetic local and general stimulants. The physicians of the Interior Valley were first apprised by Dr. Eberle,* that phosphorus had been employed in the typhous fevers. All his authorities were continental, and chiefly German. Nearly thirty years have

* Treat. on the Mat. Med. 1832.

, but I am not aware that it has been administered. I have intro-
it here because organic chemistry has taught us that it is one of the
ts of the brain and spinal cord, which in manhood is nearly twice
t as in infancy, old age, or in the idiotic. It seems, therefore, to be
ry to the normal activity of the cerebro-spinal centre so signally
ed in the typhous fevers.

dvanced stages of typhus, unaccompanied by cerebral or gastric
nation, when we see the vital forces, especially those of the brain,
er day becoming more exhausted, in despite of all our ordinary tonics
mulants, why should we not give this energetic element of the cere-
ass a full and fair trial? Our books of Materia Medica, above all,
mirable work of Dr. Pereira, give ample instruction as to the prepa-
management, and use of this comparatively untried excitant, and I
but hope that those who practise much among our typhous fevers,
st its powers by a diversified exhibition.

No medicine of the class we are now considering has been so gene-
dministered in the typhous fevers as opium and its preparations.
ve already seen that it is often combined with other remedies, which
r restrains or assists in their operation. Thus, united with tartarized
ny, it prevents an action on the bowels, and promotes one on the
r skin; and mingled with Spiritus Mindereri, which alone might
as a diuretic, a sudorific effect is produced. Furthermore, it recon-
he stomach to many medicines which would otherwise irritate it, and,
neral fact, does not diminish but increases their specific effects. For
rbid sensibility and contractility of the muscles of organic life, it is
st reliable resource, often quieting the restless movements of the heart,
bove all, of the bowels; being, in fact, by far the most important
which we possess for holding in check the diarrhœa which so often
exhausts the patient in the latter stages of typhus. To this end it
e combined more or less with all our tonics, astringents, and stimu-
whether given by the mouth or thrown into the rectum. If our
s produce strangury, its combination with camphor will give early
When hemorrhage occurs, its liberal administration, with or without
gents, is generally beneficial. But, above all, it is adapted to the
of innervation in the organs of animal life. I do not mean that it
tablish such an action as will set aside that which I have assumed to
tute the first link in the morbid chain, but it unquestionably exerts a
ting and sustaining power. From its administration many a patient
joyed a more comfortable night than if it had been omitted; and
have derived manifest benefit from its supporting influence, when
lly given in a solid form at regular intervals. This method, long
to the profession, but not always recollected, I have certainly found
tageous. Inflammation of the abdominal and thoracic organs does
n my opinion, contraindicate the use of opium; that of the brain
certainly does. How shall we always decide, however, between in-

are both local and general stimulants, but their effects on th
large are much more transient than upon the surface to whi
plied, and which they can speedily irritate into inflamm
bonate is generally employed. It is frequently admin
a suddenly developed subsultus tendinum; but more e
the sinking energies of the heart and capillaries, esp
skin and lungs, and hence it is common to give hot w
time. As the milk employed for this purpose is so
our wines are acid, the probability is, that in many
bonate is decomposed, forming the lactate, aceta
ammonia, or several of them. This, however, c
the carbonate be administered in liberal quantiti
salts, readily taken into the circulation, probal
secretory organs, and thus enlarge the sphere
the true reason why wine whey rather than
become associated with the carbonate of am
gastritis or cerebritis be present, the carb
cated. Experience has shown, however,
fevers it may be administered freely, and
of the inflammation, and causes increa
membrane. Thus it comes to the relie
bility and low degree of inflammatory
antimony and cupping would be inju

Hemorrhagic tendency, with that
we know to be a reality, and to wh
putrescent, contraindicates a lar
ammonia, as that medicine, not
duction of such a state, with s
the danger of hemorrhage.
speculation of putrescency, c
sition may be the developm

Our prescriptions are so
by the patient has, by the
of neutral carbonate or
greatly reduced. In ca
of this medicine, the pre
in the twenty-four hour

10. Under the head.
as a tonic which conta
That element belongs
The physicians of th
that phosphorus had
rities were continu

by
functions
ality in con-

s more in the be-
that drug. It is,
nd more proper when
ay be advantageously
tical action.
f all the preparations,
sinkings of the vital
ly in such cases, without
genuine *eau de vie* of
with whiskey or its
As a general fact it is
of the kidneys to
excrete its contents,
either. If diarrhœa
best.
been the favorite.
even when, as is
nous astringent matters.
the brain and heart,
unquestionably
bounding in acid, they
blood in the last

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and porter are
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maller proportion
gentian or colomba,
ich they may be sub-
vantage to the patient.
nployed in the continued
nd America, but little men-
I think have never employed
receptor, long ago, lead me to
icle is not the consequence of un-
re attention than it has received.
y obvious. Fermenting poultices im-
ghing ulcers, and not only correct the
ppear to aid in arresting the progress of
uired the name of an antiseptic or opposer
nistered internally to correct, which to some
condition of the intestinal contents. It was
, when petechiæ, vibices, and hemorrhages were
a putrescent state of the blood, to believe that
iso, and hence its administration when those symp-
is only when in active fermentation that yeast pos-
erties. In that state it liberates alcohol and carbonic
is been conjectured the effects of this substance depend.
to suppose, however, that its contact with certain matters
y canal may establish in them an alcoholic fermentation, and
of the putrefactive kind. The influence of yeast on the
in is not such as to contraindicate its use in the early stages of
r when inflammation exists in the more advanced, and still when
red in deeply atonic states of the system, it seems to exert a re-
and invigorating influence. If diarrhœa be present, it is necessary
ine laudanum with it. If the bowels are costive, it will prove aperient,
both conditions may act as a carminative. When the bark seems
d, it may be advantageously combined with this substance. To re-

extreme restlessness; a sinking and extreme frequency of pulse; a tendency to syncope on being set up in bed; ghastly countenance and early death, are characteristic phenomena following on this lesion; and clearly indicative of peritoneal irritation and inflammation combined. When the aperture at the beginning is very small, the first escape of the contents of the bowel may excite adhesive inflammation in the surrounding parts and arrest a further escape, after which the patient may recover; but such cases are extremely rare, and this lesion is generally fatal within forty-eight hours after its occurrence. Stimuli will not support the energies of the system when they are invaded by the impress of foreign matter on an extensive serous membrane; and antiphlogistics, even if the previous condition of the patient might have rendered them admissible, are powerless in the reduction of an inflammation kept up by the continued presence of its cause. Blisters are useless, and we are confined to the palliative effects of opium, and warm fomentations.

IV. A retention of urine has been already mentioned as frequently happening in the closing stages of typhus. It is impossible for the nurse to have accurate information on this point, nor can the patient be trusted, and the physician at every visit should carefully explore the hypogastric region for a cystic tumor. Diuretics are of little value in such cases and may even do harm by increasing the secretion without promoting the excretion of urine. The application of a lump of ice above the symphysis pubis will sometimes be followed by evacuation; but on the whole nothing can be trusted to but the catheter, which should be introduced once or twice every twenty-four hours.

V. In the exhausted state of the patient in the closing stages of these fevers, when diarrhœa is so often present, the patient should never be placed on the close stool, which has sometimes been followed by immediate syncope and death. He should be required to use the bedpan, or when that is found inconvenient be placed on a square of India-rubber cloth which should be immediately removed, and thrown into water. Under no circumstances should the excretions, uninary or fecal, be allowed to remain in the chamber, or put away, as too often happens, in some close, supplemental room.

VI. In the progress of a fever running on for several weeks, nurses are apt to become inattentive to the cleanliness of the sick chamber. It is frequently kept so dark that small accumulations of filth are not observed; there is a prejudice against washing the floors; the nurse becomes accustomed to the smells of the room, and ceases to notice them; finally, as the patient gets weaker, and the heat of the body declines, the cool air is very commonly shut out. All this is wrong. The linen of the patient and the bed should be changed daily; articles not needed in the room should be sent out; the floor should be frequently washed and dried by fire, when the weather is not hot and dry, and fresh air admitted freely whatever may be the season of the year. The surface of the patient's body may always be protected by

quate bed-covering, and the impress of a cool and fresh air on his lungs is itary. It is proper also to wash the surface frequently, and especially eyes and mouth; mucus should not be allowed to accumulate around former, nor sordes on the teeth, lips, and tongue. For this purpose e is nothing better than vinegar and water. Unfortunately, the typhous rs prevail most where the necessity for these sanitary domestic measures reatest, and the means of executing them least.

III. Deodorizing and Disinfecting Substances.—Chloride of lime, ate of lead, and chloride of zinc have been employed as deodorizing nts. The first was proposed some time since by M. Labarraque; the nd and third, more recently, by M. Ledoyen and Sir William rnett. Their power over putrefaction and the offensive odors which it erates, is such as to render them useful in the typhous chamber, when- r the source of an offensive smell cannot be destroyed. If not limited uch cases, they may do injury by favoring unobserved accumulations of , from which pernicious gases not decomposable by these agents, may e. The judicious physician will not therefore be forward in recommend- them to the nurses of his typhous patients. Yet when bed-sores or cesses are offensive between the times of dressing, they may be used, and olution of the chloride of lime or zinc, is, as we have seen, a good wash such surfaces. They may also be thrown into the bedpan and urinal, ovided that the deodorizing of their contents does not lead to the retention them in or around the chamber.

The deodorizing property of those agents suggest their employment as infectants, to which end various experiments have been made, but their ims have not been established. Before the discoveries of Ledoyen and rnett, the chloride of lime had lost most of a reputation which at no me rested to much extent on anything but its deodorizing qualities. In gland, some observations and experiments, a few years since, rendered the ims of the two other agents so plausible, that in 1847 the British Govern- nt sent quantities of both to Dr. Stratton, R. N., to be used at Quebec d other places on the St. Lawrence. At the same time M. Ledoyen came r accompanied by Col. Calvert, an agent of government, to assist in e projected experiments to be made. In the midst of them, M. Ledoyen perienced an attack of the fever, from which he recovered, but Col. lvert, less fortunate, fell a victim to the disease. Dr. Stratton conducted e experiments with the Burnett fluid, and he published his conclusions.* e saw no result indicating a disinfecting property in the Ledoyen fluid, hile the depressing effect of the lead seemed to be injurious to the patients. hree of them kept wrapped in towels dipped in the solution died. As an tiseptic deodorant, moreover, its powers were not equal to those of its al, which he found entirely capable of arresting putrefaction and destroy- all the odors it sends forth. He made some experiments on its capa-

* British American Journal, vol. iv. p. 31, June, 1848.

extreme restlessness; a sinking and extreme [illegible] Hospital in to syncope on being set up in bed; ghastl[illegible]n patients, in are characteristic phenomena following on [illegible] which it was withheld, tive of peritoneal irritation and inflammat[illegible] tallies very well with the ture at the beginning is very small, the [illegible] some of the British ships bowel may excite adhesive inflammation [illegible] venture on the conclusion that a further escape, after which the pati[illegible]r was he able to test it in the extremely rare, and this lesion is [illegible] Quebec at the time he received after its occurrence. Stimuli will [illegible]ly, that the true method would be when they are invaded by the in[illegible] where, if it possessed a disinfecting serous membrane; and antiphlo[illegible] spread of the fever.

patient might have rendered [illegible] character might be made in private of an inflammation kept up by [illegible] where several or all the members of a ters are useless, and we are [illegible] and from which the first patient is warm fomentations. [illegible] an early resort to this agent, no special

IV. A retention of ur[illegible] ness or ventilation, be found in a large pening in the closing s[illegible] disease to the first patient, while in others, have accurate informati[illegible] in similar circumstances in which it was not the physician at eve[illegible] members in succession, the corrective and for a cystic tumor. [illegible] would be established. Yet it would remain even do harm by i[illegible] ated on a contagious secretion exhaled by of urine. The ap[illegible] within his dwelling. sometimes be f[illegible] trusted to bu[illegible] twenty-four

V. In t[illegible] fevers, wh[illegible] on the c[illegible] and deat[illegible] found [illegible] be in[illegible] shou[illegible] or [illegible]

CHAPTER XVI.

[illegible] FEVERS WITH YELLOW, REMITTENT, AND [illegible] SECONDARY TYPHUS; TYPHOID STAGE.

SECTION I.

[illegible] TYPHOUS FEVER: ICTERO-TYPHOUS.†

a[illegible] low fever is a disease of hot climates, and is [illegible] extended beyond the 35th degree of latitude, where [illegible] about 80°, and that of the year 70°. [illegible] more in the higher than the lower latitudes, [illegible] almost unknown where the heat of the year [illegible] above the degrees just given. [illegible] prevails most on low levels near the sea— [illegible] occurred at an elevation of more than 400 feet.

[illegible] March 1848

[illegible] would be well to look over the parallel between yellow [illegible]

The typhous fevers are essentially continental, and prevail in the Apahian Mountains and those of the territory of Santa Fé.

3. Yellow fever occurs almost exclusively in our cities and towns; hous fever on the other hand, prevails equally in town and country.

4. Yellow fever generally occurs as an epidemic, and in the northern tion of its zone is never sporadic: typhous fevers on the contrary are h epidemic and sporadic in every region which they infest.

5. Yellow fever within our Valley scarcely ever sets in till after the mmer solstice, and as constantly ceases before the winter, being at its ght about the autumnal equinox. Typhous fevers occur sporadically oughout the year; and have been epidemic in every season.

6. The onset of yellow fever is generally sudden and violent—that of hous fevers slow and insidious. The ordinary duration of one is five or en days—of the other three times that period.

7. A cutaneous maculation or efflorescence is a frequent event in typhous ers, but is absent in yellow fever.

8. Prolonged yellow fever is almost unknown; but a short and fatal hous fever is not very uncommon; it does not, however, display the mptoms characteristic of yellow fever.

9. In the closing stage of yellow fever there is suppression of urine; in at of typhous, retention, with broad exceptions to both.

10. Typhous fevers are sometimes contagious: yellow fever never.

11. The closing stage of yellow fever is attended with the black vomit—at of typhous fever not.*

12. The most striking morbid appearances in yellow fever are found in e stomach, duodenum, and liver:—in the typhous fevers in the brain, ngs, ileum, and spleen.

13. Yellow fever is followed by quick and perfect recovery—typhous vers have a slow and imperfect convalescence.

II. Identities or Analogies.—Both are continued fevers: both are companied with hemorrhages in the latter stages: both confer an imperct and uncertain immunity from a second attack: both originate and come epidemic in certain but not the same localities: both appear at nes to be introduced: both originate in ships at sea, but not often when ey were sailing in the same latitudes: finally, both seem to run, respecvely, a destined course, in despite of medical interference.

III. Union of Diathesis. Ictero-typhous.—Were the climatic and pographical relations of yellow and typhous fevers less diverse, we should ubtless see them oftener conjoined than we now do.

[MSS. wanting.—Ed.]

* The closing stage of yellow fever is generally unattended with delirium—that of the typhous fever ays with delirium or impassibility—abolition of intellect.

SECTION II.

REMITTENT, AUTUMNAL, AND TYPHOUS FEVERS.

I. DIVERSITIES.—*Remitto-typhous: typhoid stage of remittent fever.*—1. A mean annual temperature below 40° with a summer mean heat below 60°, extinguish remittent autumnal fever; but are not incompatible with a general prevalence of the typhous fevers. The former is epidemic only in autumn—the latter in every season.

2. Extended dryness of surface, the absence of decomposable organic matter, and circumstances characterizing the densely populated portions of our larger cities, greatly diminish, or prevent autumnal fever, but not typhous.

3. Typhous fevers are sometimes contagious,—sometimes introduced,—autumnal remittents never.

4. The natural termination of remittent fever is in intermittents; but not so with typhous.

5. One attack of remittent fever predisposes to another; but it is otherwise with typhous.

6. The copious secretion of bile and derangements of the biliary function so characteristic of remittent fever, are absent in typhous.

7. The maculæ in typhous do not occur in remittent fever; and hemorrhages are rarer.

8. The coma, subsultus, sordes of the teeth, and dry red tongue of typhus, are not necessarily present in remittent fever.

9. When both assume a malignant character and prove fatal within a few days, the assemblage and succession of symptoms is not the same.

10. The sulphate of quinine arrests remittent fever, but not typhous.

11. The pathological appearances in remittent fever are mainly in the stomach, duodenum, spleen, and liver—those of the typhous fevers more in the ileum, brain, lungs, and spleen; though there are many exceptions to both rules.

II. RESEMBLANCES, OR IDENTITIES.—In many cases the access or forming stage is nearly of the same length in both; and sliding into an intermittent type, the remittent may endure as long as a protracted typhous fever.

1. Both may have a full epidemic development in the same climates, whether on land or sea.

2. In the early periods of the stage of excitement, the remittent may approach so closely to a continued type, that the two fevers may be confounded.

3. Both attack males more than females.

4. When remittent fever terminates fatally in one or two weeks, a certain amount of subsultus, a dryness of the tongue, and intestinal hemorrhage, are sometimes present, although no typhous fever may be prevailing in that locality, and this brings us to inquire, not into the distinctive peculiarities

hemselves every year. Repeated references have been already made

ningling has led some speculative men to assign them a common
id to constitute them a single species. But such a coalition would
ade by one who had been familiar with *both* forms, and had the
monic characters of each impressed on his mind by sporadic and
cases, when the other was entirely absent. We know a febrile
by its phenomena, its relation to remedies, and its post-mortem
Thus tested, the diathesis of primary typhous and that of periodical
e as distinct from each other as the diathesis of measles is from
carlet fever, or exotic epidemic cholera from our endemio-epidemic
norbus. Yet measles and scarlatina may prevail at the same time,
lify each other; and throughout the present, as well as the two
g summers (1849–'50–'51), many cases in various parts of our
which commenced as endemial cholera morbus, diarrhœa, or dysen-
minated as epidemic cholera. If the remote cause of the latter
ually and permanently reproduced among us, like that of the former,
d every summer have such cases, and might at last conclude that
remote cause existed; and, to borrow a chemical expression, that
se was a simple element, instead of a binary compound. The
d mercury which the young student of pharmacy triturates together,
him equally simple, yet the chemist knows that the former is a
d, because he has resolved it into three elements, studied them
y, and reunited them into chalk. We cannot thus analyze morbid
but nature presents us with their uncombined elements—indigenous
when the foreign has been long absent, and the latter, in the depths
r, when the former never occurs. By thus studying them apart
h other, we learn the characters of each, and when they unite in

phosphoric acid and lime of the bones; but others, as water and alcohol, will combine in all proportions; and *they* represent to us the union of the typhous and the periodical elements of the fevers now under consideration, which, in fact, mingle indefinitely. Thus we sometimes see a typhous fever with such a morning abatement as inspires hopes of an early intermission, and the successful use of the sulphate of quinine, which nevertheless may fail. At other times we have an early development of typhous symptoms, when the locality and season of the year clearly indicate the presence of the remote cause of autumnal fever. In some autumns, almost every case terminates by crisis, or in the intermitting type; in other seasons, a large proportion, after the first week, display a typhous character. In the high latitudes or altitudes, the type of the fever may be continued, and yet show its relation to periodical fever by prevailing chiefly in the latter part of summer, and in early autumn, and by terminating without the characteristic symptoms of typhous in the second week, corresponding to the time when remittent fever often terminates by a crisis, or in the intermittent form. This is the synochus of the St. Lawrence, an autumnal fever in which the periodical element is feeble, and the typhous not malignant.

I have already said that in some autumns only here and there a case of remittent fever, in its progress, assumes a typhous character; while in other seasons in the same locality a large proportion take that course. Now is the pathological character of the sporadic and the epidemic cases the same? As far as we may rely on the symptoms it is. At least I have not been able to detect a difference, nor am I aware that any of our physicians have. It would appear, then, that the occult agencies which modify the type of our autumnal fever, may be developed on a most limited, or a most enlarged scale, which being also the law of primary typhous, brings us through etiological views to the conclusion, that secondary or remitto-typhous depends on the same cause with primary, acting in concert with the cause of remittent fever. It appears, still further, that within the latitude in which typhous fever occurs, its cause or causes are more or less developed every autumn. There is, however, another view of the origin of sporadic secondary typhous, which ascribes it to the treatment pursued in remittent fever. Thus the premature administration of tonics and stimulants, developing a low cerebral inflammation; copious bloodletting, producing constitutional irritability with vascular inanition; and drastic purging, raising an irritation in the alimentary mucous membranes with general exhaustion, have all been charged with producing the pathological state we are now studying. That they may contribute to it, is, I think, extremely probable; but we all know that these active measures have been often employed, without being followed by secondary typhous; and that it has supervened when none of them were used. Something else seems therefore to be in action.

currence. Its development generally begins in the second week, and its earliest manifestations is a shortening of the morning remission t *should be* lengthening; at the same time, the tongue, previously with a moist, white, or yellowish fur, begins to dry, and the fur as- a dead-leaf color; the cheeks display a circumscribed dark or dusky he patient becomes more composed, and at length, whenever his atten- not engaged, begins to doze; in that condition but not when wide a slight subsultus tendinum may be perceived; a low delirium soon ; the heat of his skin continues and often becomes more pungent, pulse increases in frequency though not in fulness or force. The dejections characteristic of remittent fever often diminish or entirely and the discharges, sometimes diarrhœal, become more offensive.

progress of development of these symptoms is various. I have seen of them occur with severity in a single night, giving a new morning to a case which seemed likely to present an intermission; and I have en them slowly developing through several days. In some cases the or jaundiced hue of the remittent diminishes, in others it continues or ncreases; and sometimes it does not show itself, till after the typhous oms have set in. It is not necessary to trace out these symptoms to se. In many cases they continue mild, and at length show such a g remission, as proves that the periodical diathesis is not extinct. In however, they are regularly ingravescent, till the patient is brought condition which cannot, I think, be distinguished from primary s.

TREATMENT OF REMITTO-TYPHOUS.—During the reign of a typhous pheric constitution, the evacuant and debilitating treatment, which, ple and inflammatory remittents, is safe (although not required to tent to which it has been carried), should be employed with reserve.

ch is required for a complete evacuation of the bowels, in the early stage. al bleeding may be proper, but in general is seldom admissible. The best alterative is tartarized antimony; should the biliary derangements be great, calomel may be given in alterant doses, but should not be continued to the production of constitutional effects. Cold water may be used freely, and sudorifics with gentle anodynes administered at night. Under the use of these mild means, decided remissions eventuating in intermissions are looked for, and sometimes occur, when the bark or sulphate of quinine may terminate the fever; not unfrequently, however, it goes on to a full development of the "typhoid stage" or secondary typhous; and a better plan is a *desideratum*. Such a method, is, I think, to be found in what I have presented, Book II. Part I. as an i f treating ordinary remittent fever. It consists in the ne f everything just enumerated, but the lancet and a simple ying the former early, and drawing blood till syncope impe nistering a liberal dose of sulphate of quinine and opium, . If the typhous diathesis can be met at all by the quini r such circumstances. If it should not succeed, the de he "typhoid stage" follows as a matter of course. gement of this stage demands both sagacity and patience. tibilities and forces are reduced, and the solid tissues r d; the blood is impoverished and deteriorated, the secr l and depraved, and in many cases some organ—as the brain, the ileum, or the lungs,—is in a state of subacute inflammation. Tonics, stimulants, and nutrients are demanded, yet if actual inflammation be present, they must be withheld until by local bleeding, watery affusions, or blisters, the inflammation is brought down. Even when it does not exist, corroborants and restoratives may fail or prove mischievous, if the secretions and excretions, especially those of the skin, liver, and bowels should not be re-established. To their re-establishment, it is true, tonics and food often contribute in a decided manner, but they also fail, and render a resort to stimulating diaphoretics, cholagogues, and aperients indispensable. Stimulation without secretion cannot be continued with impunity. But it is superfluous to go into the details of this treatment, seeing that it is substantially the same as that already indicated for the advanced stages of primary typhous fevers.*

SECTION IV.

TYPHOUS COMPLICATION WITH VARIOUS OTHER DISEASES.

At times the typhous diathesis or type manifests its presence in various febrile and other diseases, besides yellow and remittent autumnal fever; but

*For a more extended account of the proper treatment of the "typhoid stage" of our autumnal fevers, the author begs leave to refer to an article of his own in the Western Journal of the Med. and Phys. Sci. (Cincinnati), vol. i. p. 381, A.D. 1827.

these complications must be studied when we reach those maladies. The most important are pneumonia and some other of the phlegmasiæ; the principal eruptive fevers as measles, scarlatina, and small-pox; dysentery, puerperal fever, scorbutus, and erysipelas. This complication always modifies their symptoms and treatment *unfavorably;* never simplifying the former, nor contributing to a better result from the latter.

Sometimes these complications are sporadic, at other times epidemic following the same law of prevalence as the *primary* typhous fevers. As a general fact, we may say that the typhous diathesis has preceded the other, and so modified or degraded the constitution, that when the causes of those different maladies have awakened them, their symptoms, course and termination give them an aspect and an intrinsic pathological character, which assimilates them to the typhous fevers.

Of these pathological compounds, one which sometimes occurs sporadically, but has also, as we saw in Chapter I. of this Part, appeared as a wide-spreading and fatal epidemic, is pneumonia. Still further, during the reign of an epidemic typhous constitution, all the phlegmasiæ are more or less modified by it, so that the antiphlogistic treatment which they ordinarily require is no longer admissible, except in a limited degree. Of the pernicious influence of this diathesis in the true eruptive fevers, every experienced physician is fully aware. It is common to speak of those fevers as being mild or malignant from variations in their respective remote causes, but we cannot thus view pneumonia, because its specific remote cause, atmospheric condition, does not vary, and hence it seems more reasonable to ascribe the grave, adynamic, and ataxic character in which those epidemic exanthemata sometimes appear, to a previous lesion of the constitution produced by the typhous poison. The same reasoning applies to puerperal fever, which is ordinarily a simple phlegmasiæ of the serous membranes of the pelvis and abdomen, but at times a formidable fever of a typhous physiognomy.

In dysentery the same dangerous tendency to a typhous condition is sometimes sporadic; at other times epidemic, when it becomes one of our most fatal maladies.

It is perhaps in erysipelas, whether sporadic or epidemic, traumatic or idiopathic, that we most frequently observe a typhous tendency. If this malady cannot be classed with the phlegmasiæ, to which in many instances it is closely allied, it never exists without inflammation. Yet the erysipelatous fever is not as phlogistic as that accompanying the true phlegmasiæ, and in all cases the physician regards the development of typhous symptoms as an unwelcome event, which may possibly happen.

With these notices of the blendings of a typhous diathesis with various forms of disease hereafter to be studied, the author takes leave of the continued or typhous fevers. He has endeavored to present an outline of their causes, symptoms, and modes of treatment in our Interior Valley, and to discuss their etiology, nosology, pathology, and therapeutics, by the

facts furnished by this, with, to some extent, several other countries. He confesses that he has found the discussion difficult; and is not satisfied with all the conclusions at which he has arrived. A deeper knowledge of the organization, vital properties, and functions of the healthy body, a more profound acquaintance with the relations between that body and the external agents which act upon it; an acuter discrimination among the types of morbid action, and a keener analytical sagacity, would have given results of a more reliable kind. He has but enlarged the opening of a new quarry, and brought forth some materials for such a future architect, and must therewith be content.

PART FOURTH.

ERUPTIVE FEVERS.

INTRODUCTION.

a transition which may almost be called natural, which at least is abrupt nor arbitrary, we pass from the typhous fevers to the erup- This may be shown in a few paragraphs.

n both groups the fever has a continued type, and in general cannot sted by art.

nflammation commonly occurs in connection with the fever, but in ant and early fatal cases, in both groups, death may occur without nation.

n harmony with this is the fact, that the fever, with occasional excep- precedes the inflammation in both groups.

n the respective members of each group, there is some particular sur- tissue which is the seat of the characteristic inflammation, yet and many other parts are liable to that affection in the course of the and the danger, when death does not occur, as already stated in the ing, is in proportion to the extent or intensity of the inflammation, n connection with its seat.

As a pathological fact common to both the typhous and eruptive , the inflammation partakes more of the character of simple or pas- ngestion, is less acute, the hyperinosis of the blood is less developed, e phlogistic diathesis of the organism is less intense, than in the true asiæ which compose the next group.

In the typhous fevers, maculæ and efflorescences occur in a large r of cases, giving to these a close resemblance to certain eruptive

ome members of both groups are unquestionably contagious, while are not.

An epidemic prevalence is common to (nearly) the whole of both lages; and while some of the eruptive fevers, as small-pox, never sporadically, others, as urticaria and erysipelas do.

9. A reigning typhous constitution does not exclude the eruptive fevers, but modifies them perniciously.

10. Contagious typhous fevers sometimes have an immediate local origin; and the same is true of erysipelas and apparently of scarlatina.

In proceeding to treat of the eruptive fevers, erysipelas should perhaps be first introduced, as having the closest resemblance to the typhous fevers; but as it has an equal affinity with the phlegmasiæ or phlogistic fevers, it may with nosological propriety be placed next to them, and thus constitute the connecting link between them and the group we are now about to study. There is, moreover, a philosophical propriety in beginning with the most noted member, that which gives distinctive character to the group, and I shall, therefore, commence with the small-pox.

As the most important of the eruptive fevers arise from specific poisons, and are not greatly modified by geological, topographical, climatic, or social influence, this part of our work will of course present less of what is peculiar to our Interior Valley than the three through which we have passed; and must consequently assume more of the manner of a systematic work on the theory and practice of medicine. Greater conciseness will be, therefore, both practicable and proper. As to the number of maladies to be introduced into this PART it cannot be great. The reader must not carelessly confound the import of the phrase eruptive fevers with the expression cutaneous diseases, and expect to see the whole introduced here, for he will find only those which are accompanied with fever.

As to a classification of these maladies, it is not perhaps of much importance, as they differ so much from each other, that each must be studied apart from the rest by the practical physician, yet as *any* kind of order is preferable to disorder, I shall class them as follows:—

DIVISION I.—VESICO-PUSTULAR.

Variola,—*Small-pox.*
Vaccinia,—*Cow-pox.*
Varioloid,—*Modified Small-pox.*
Varicella,—*Chicken-pox.*

DIVISION II.—EXANTHEMATOUS.

Rubeola,—*Measles.*
Scarlatina,—*Scarlet Fever.*
Roseola,—*Rose-rash.*
Urticaria,—*Nettle-rash.*

DIVISION III.—ERYTHEMATOUS.

Erysipelas Sporadica,—*Sporadic Erysipelas.*
" Epidemica,—*Epidemic Erysipelas.*

CHAPTER I.

SMALL-POX [VARIOLA].

SECTION I.

PREVALENCE AND ETIOLOGY.

PREVALENCE.—As the greater part of the Interior Valley has been settled since the discovery of vaccination, small-pox has never prevailed as a wide-spreading and mortal epidemic. Nevertheless, it has visited most of the towns which lie on the highways of intercourse, where, even down to the present time, it has never failed to excite alarm, and lead to measures for secluding the infected, and thus limiting the spread of the disease. Its visitations have not been confined to particular latitudes, but have occurred from Lake Superior to the Gulf of Mexico; yet they have, I think, been more frequent and fatal in the North than the South, owing, perhaps, partly to the influence of climate, and partly to the greater number of towns and freer intercourse between them in the former than the latter. It has also penetrated far into the wilderness, and proved extremely mortal among some of the Indian tribes. Whether it has ever prevailed among us as an epidemic, originating independently of contagion, I am unable to say. We know it only as an introduced and contagious malady, which sometimes spreads much more than at others. Inoculation was never generally practised in the Valley, and before, perhaps even since the introduction of vaccination, the spread of natural small-pox has been restrained more by non-intercourse with the sick than in any other way. A majority of our physicians have never treated or even seen a case of small-pox; and many of them, notwithstanding their vaccination, would prefer not to visit a patient laboring under that disease; nor would any class of our medical students permit a clinical professor to bring a small-pox patient before them. This manifestation of a want of confidence in vaccination, contributes to perpetuate the popular incredulity of which it is a part, and justifies this notice, which is designed to recall attention to a violated duty.

But little modified by climate or states of society, and amply discussed in its diagnosis and treatment by all the systematic writers, I shall, in this article aim at nothing more than a condensed practical history of the disease, unencumbered with the citation of many authorities, either foreign or domestic.

ETIOLOGY.—Although small-pox has in some countries *appeared* to begin or prevail independently of contagion, in this we know it only as the offspring of that agent. 1. The exhalations from the body of a patient laboring under the initiatory fever may occasion the disease. 2. The ex-

halations from the pustulated surface are a still more certain cause. To what distance they may spread and still be sufficiently concentrated to generate the disease is uncertain. Doubtless the amount of infection exhaled, and the degree of ventilation will materially influence the result; but in general the radius of the infected atmosphere may be expressed by feet rather than yards. 3. The scabs or clothes impregnated with the discharge from pustules may communicate the disease long after they have been detached, if they have not been exposed to the decomposing influence of a very high or a very low temperature. 4. The exhalations of the patient absorbed by fomites may propagate the disease, but at a less distant period than solid matter. 5. The disease may, as all the world knows, be propagated by inoculation, to which end an exceedingly small quantity of matter is sufficient. Whether the milder character of small-pox under inoculation, is owing in part to this cause or wholly to the previous preparation of the patient, is not, perhaps, a settled point, but from analogy we may conclude, that *cæteris paribus*, the violence of the malady will be in proportion to the amount of the remote cause. Nevertheless, violent and confluent cases have resulted from exposure to those of the mildest kind, *et vice versa*. The length of time which elapses after the impress of the remote cause, before the commencement of the initiatory fever is not uniform. The range of variation may be stated at a week. Thus the fever rarely if ever supervenes before the seventh day, and may be deferred to the fourteenth. It is a popular opinion that the ninth is most frequently the day of commencement, but the experience of the profession rather decides in favor of the eleventh, twelfth, or thirteenth. It does not appear that the disease manifests itself at an earlier period after exposure to concentrated than dilute infection. In some cases of the former kind an immediate undefinable indisposition has followed the impress of the poison; the *fever* being deferred, however, to the usual period of access. In a great number of instances the stage of incubation is unattended with any indisposition.

SECTION II.

SYMPTOMS.

ERUPTIVE FEVER. — If those who have had an ample experience in small-pox cannot with much certainty recognize the effect of its contagion in the symptoms which characterize this stage of the disease, the physician who sees it but seldom, will observe little else than a simple inflammatory fever unaccompanied by any manifest local inflammation. One long, or a series of short chills are followed by violent reaction, characterized by thirst, a white tongue, heat, an active—often a tense—pulse, restlessness, severe head and backache; epigastric pain, nausea and vomiting; occasionally delirium; in children a certain degree of drowsiness, and not uncommonly

more convulsions. On the second day the continuance of the fever
s it not to be of malarious origin, while the diffusion of the pain and
through the head, back and limbs, and the want of manifest concen-
of morbid action in any particular organ, will suggest that the disease
simple phlegmasia. In the course of the third day it becomes ap-
that the patient labors under one of the exanthemata; but which,
always be told from the appearances. The absence of catarrhal
ms, however, will indicate that it is not measles; and the absence
t mildness of the anginose symptoms, taken in connection with the
efflorescence on the neck and breast, will with almost equal certainty
at it is not scarlatina. With the outbreak of the eruption the fever
to abate, and the patient becomes more comfortable.

PTION.—This shows itself in the form of red elevated points or
, which in nearly every case show themselves first on the face, and
sively on the neck, arms, trunk, thighs, legs and feet, seldom reach-
last under two days from the beginning of the eruption, by which
e eruptive fever generally ceases. When the papulæ are not very
us, the case is denominated distinct or discrete, and the danger is
when very numerous and crowded so as to run together, it is called
at, and is always dangerous. The eruption is not limited to the skin,
ends more or less to the mucous membrane of the air-passages, from
nasi to the bronchial tubes, and from the lips to the œsophagus.
the stomach and bowels is not often or much affected; and accord-
he testimony of the best observers, notwithstanding the eyes are
verely attacked in a subsequent stage of the disease, they are seldom
ts of eruption.

progress of the papulæ is to vesicles with inflamed bases and indented
; then to pustules, which at length lose the indentation and assume
pherical form, except in the confluent variety, where their number
es with a regular development. Each pustule before it arrives at
nced stage comprehends a number of cells, formed by membranous
ns, which radiate from its centre. These are broken down with the
s of suppuration, until at length a single cell or cyst only remains,
y careful dissection may be lifted out of its bed in the cutis vera.
gress of maturation follows that of the efflorescence, so that it is
ed first on the upper parts of the body. When the pustules are
rmed the cuticular covering gives way and the contents gradually
, at the same time hardening into scabs, which generally takes place
or eight days from their appearance. In mild and discrete cases,
h the itching of the skin may torment the patient, there is seldom
er during the scabbing and exfoliation, and recovery is for the most
id and favorable.

are the course and termination of distinct or benign small-pox: the
t variety presents an aspect far more loathsome and dangerous. In

this grade the eruptive fever is decidedly more violent, and the brain is often so deeply involved, that the disease might be mistaken for a primary inflammation of that organ. The papulæ, which appear rather earlier than in the other variety, are so numerous as to give to the face, on which they are first seen, and on which they most prevail, a uniform redness, but unable from interference to develop themselves, the areolæ which surround the discrete pustules is not formed, and very soon the surface takes on a whitish appearance from the secretion beneath the cuticle. The inflammation descends into the skin, and often invades the cellular tissue beneath. Few or no centrally depressed or umbilicated pustules are formed, but all the parts over which the confluent eruption extends become invested, as it were, with a fictitious integument. Great swelling, of course, takes place, especially of the head and face, so that the eyes are sometimes entirely closed. The mucous membranes, already enumerated as liable to variolous eruption, suffer almost equally with the skin, and great nasal or laryngeal difficulty of breathing, and much difficulty of deglutition, ensue. The quantity of purulent secretion is very large, and ultimately forms an incrustation, which, exfoliating, presents a surface beneath of a raw, purple, or livid appearance, often deeply and permanently pitted. During the whole progress of this maturation the eruptive fever continues, and thus constitutes a distinguishing character of this variety, compared with the mild and discrete form, in which it ceases on the appearance of the efflorescence. In eight, nine, or ten days after the first appearance of the eruption, the disease often terminates fatally. In some the state of the larynx interferes with respiration, and destroys life by impairing that function; in others death is the consequence of lesions of the brain; in others there is general exhaustion of the vital forces, with extensive cellular suppurations, sloughings, or gangrene. Should the patient survive these accidents, new dangers await him. As the scabbing commences, the fever revives, and, under the name of *secondary*, often proves fatal. This is generally most violent when the affection of the mucous membranes has not been great, but the cellulitis and subcutaneous suppuration violent. The pustulated surface becomes hard and scaly, the pulse extremely frequent, the thirst intense, and the skin hot. Occurring in an exhausted system, and apparently produced by the reactive influence of the pus, which, as it were, saturates the dermoid tissue, this fever is of a true adynamic or typhous character, and is accompanied with local affections of the gravest kind. The mucous membranes, and the skin from which the incrustations have been detached, often assume an erythematous or erysipelatous hue, and vesications arise which sometimes become gangrenous; diffuse suppurations, or gangrene of the cellular substance, rapidly supervene; the lymphatic ganglia become the seats of abscesses; the eyes, of an inflammation which too often ends in sloughing and total blindness of one or both; cerebral inflammation, not unlike that which supervenes in the advanced stages of autumnal fever, sets in; and the lungs

often become the seats of an inflammatory congestion, not unlike that which constitutes our typhoid pneumonia. Should the patient survive this stage of the disease, he may still be pursued by chronic disorders of an afflicting or ultimately fatal character. These are indurations or even suppurations of the ganglia of the neck; earache, or ulceration of the auditory passages; chronic ophthalmia, with ultimate closure of the pupil; lastly, a fatal phthisis. In all of these cases there is a strumous taint which the small-pox has aroused into activity.

Sporadic cases of confluent small-pox occur, as the consequence, no doubt, of peculiarity of constitution or improper treatment in the early stages; but at times a whole epidemic has shown that tendency, while another has been as generally mild and discrete. These differences can only be referred to prevailing or epidemic constitutions of the atmosphere. When, for example, a typhous constitution obtains, small-pox may be expected to assume a confluent character; and it is in the fullest development of such a constitution that it displays not only the symptoms which have been described, but hemorrhages, petechiæ, and other signs of malignity, which, in some cases, replace the eruption, and obscure the diagnosis of the disease.

[SECTION III.

PATHOLOGICAL ANATOMY.*

1. *Nervous Centres and their Envelopes.*—In proportion to the disturbance of the functions of the brain during life, accompained with high fever and swelling of the head and face, especially if the patient expire comatose or in convulsions, the blood-vessels of the brain and its envelopes are found distended, with serous effusion beneath the arachnoid, into the ventricles and spinal sheath. These lesions are evidently common to various disorders.

2. *Organs of Respiration and Circulation.*—The mucous membrane lining the air-passages presents morbid changes from the nostrils to the minor bronchial divisions. Thus it is found reddened, injected, swelled, pulpy, black, and sloughy, covered with an abundant gray or brown, thick, tenacious, puriform secretion. False membrane, white or gray, thin and paper-like, and easily separable, is occasionally found lining the trachea and bronchial tubes. With the exception of the minor evidences of previous congestion, these appearances are *peculiar* to small-pox, proving fatal from the fourth to the fourteenth day after invasion.

The lungs are engorged, displaying hepatization, purulent infiltration, or abscess; the pleura is injected, covered with layers of coagulable lymph, or adherent. Occasionally there are sero-purulent effusions into its cavity.

The right heart may be full or even distended with blood, the left empty; the pericardium containing from one to three ounces of serum.

* In the author's MSS. was found only a memorandum, in the proper place, that this section was "to be written."—Ed.

f Digestion.—The alimentary mucous membrane more seldom
ilar, though minor degree, with the respiratory. It is found
njected; the glands of the ileum, both solitary and agminated,
e of the colon, being inflamed, enlarged, ulcerated, or gan-
ages sometimes found in other diseases and cachexias, more
re the blood is known or presumed to be contaminated by the
some poison, organic or inorganic, introduced from without or
ithin the organism.

o-Urinary Organs.—Reddening and injection of the mucous
is the only morbid change occasionally found in these organs.

.—In addition to the anatomical description of the characteristic
sewhere given by the author, it may be proper here to remark that
n form according to the locality on which it is developed, being
rominent, or umbilicated, or depressed in the centre, in most situa-
but, on the face, palmar surface of the hand, and soles of the feet, it
umbilicated, and is flat, or but little raised above the surface, least so
e latter situation.

. With regard to the extension of the cutaneous pustulation to the mucous membranes, authorities are at issue. It seems highly improbable that true variolous pustules should be found in such a situation, unless the patient had died at the commencement of the suppurative stage; and if we consider the anatomical differences presented by skin and mucous membrane,—the thin and soft epithelium of the one, and the hard, resisting, almost horny epidermis of the other,—together with the striking varieties in form and development impressed upon the pustules by differences in the structure of those portions of the outer covering of the body on which they are seated, we are prepared to meet with difficulties in deciding this point. Moreover, it will be conceded that a thorough practical knowledge of the changes induced by disease in the muciparous glands of the alimentary canal, causing them to present a quasi-pustular appearance, though possessed by very few, is yet absolutely necessary to a judgment on this vexed question. On the whole, it may be most proper to state that the occurrence of variolous pustulation on the mucous membranes is probable, but requires further *competent* observation to establish it as a fact.]

SECTION IV.

TREATMENT.

When an individual who is liable to small-pox has been exposed to its contagion, he should lessen his diet, and reduce still further the excitement of his system by moderate purging. This is the extent of what he can do, not to prevent the disease, but to diminish its violence. When the initiatory fever supervenes, if its cold or forming stage should be prolonged, to

which his anxieties of mind or the debility induced by an excess of *preparation* may contribute, hot and stimulating baths and gently exciting drinks should be employed. The reaction being established, the treatment should be antiphlogistic; and comprise bleeding, purging, abstinence, diluents and cool air. As its object, however, is not to arrest but moderate the disease, it will seldom happen that more than a single venesection and one or two cathartics will be proper; and in many cases the lancet may be omitted altogether. If the headache be intense, leeches to the temples, or cups to the nucha will be proper, and the same application will do good if the gastric irritability should be excessive. If the powers of the system should be too much reduced by over-officious depletion, the eruptive stage will not be properly formed; as on the other hand its extent may be inordinately increased by a hot and stimulating regimen. Thus both extremes are to be avoided.

When it begins to appear, washing the face and eyes with cold or subtepid water, taking care not to expose the whole surface of the body so as to chill it, may limit the eruption on those parts, and protect the eyes from subsequent inflammation. To the same end, a bright light should be excluded, but in doing this care should be taken not to shut out the fresh air. If great nervous irritation, manifested by morbid vigilance, restlessness, and a pulse deficient in energy, should be present, before, at the access, or during the progress of the eruption, a gentle opiate in connection with a moderately stimulating diaphoretic, will be highly beneficial. Having protected or relieved the internal organs from accidental inflammation, and contributed his aid to the due establishment of the eruption, the physician has nearly discharged his duty. The latter having appeared, the fever in all the milder cases ceases, not to reappear, the papulæ go on to suppuration, and in due time exfoliation of the scabs is followed by convalescence. Throughout this period of maturation, all extremes of atmospheric temperature should be avoided; the bowels of the patient should be kept open, and his diet should be of a moderately nutritious character. If his nights should be uncomfortable and restless, mild narcotics will be admissible; if in the period of scabbing, the energies of his system should flag, and his skin, losing its proper temperature, assume a livid hue, it will be necessary to ply him with ale, porter, or wine, a decoction of bark, and diet of a nutritious kind; having recourse in extreme cases to carbonate of ammonia, camphor, and other diffusible stimuli; abating in the administration of the whole as soon as the symptoms for which they are given begin to cease.

In confluent cases, the secondary fever often demands great attention. In some cases it is associated with inflammation of the brain, lungs, pleura, eyes, or skin, in the form of erysipelas. These inflammations must be met with leeching, cupping, or moderate venesection; purging, saline diuretics, and opium with diaphoretics and calomel at night. In all, tepid fomentations will do much good. In the greater number of cases, however, the secondary

fever is accompanied by signs of debility and exhaustion—assumes in fact a typhous character, and calls for tonics, stimulants, and nutrients.

Of the management of the pustules but little need be said. As they appear on the scalp and mat the hair, it should be cut off as soon as the true character of the disease is discovered. When they appear on the margins of the eyelids, and threaten to invade the conjunctiva, they may be cauterized. If the patient has been allowed to scratch them, and the spot becomes raw or excoriated, it may be dressed with starch and calamine, or smeared with cream or a mild ointment impregnated with carbonate of lead. When the quantity of pus is very great, it may be absorbed by starch and Peruvian bark, or powdered charcoal, or prepared chalk. When the affection of the fauces is considerable, mopping them with a solution of chloride of sodium, an infusion of capsicum, or an acidulated decoction of bark will give relief.

After the scabs have been thrown off, the warm bath is of service; and for some time the patient should guard against exposure to a cold and damp atmosphere, which might repress the cutaneous circulation, and originate internal congestion.

CHAPTER II.

COW-POX—VACCINIA—VARIOLA VACCINA.

SECTION I.

I. HISTORY AND VALUE AS A PROPHYLACTIC OF SMALL-POX.

I AM not aware that the vesiculo-pustular disease of the teat of the cow, from which Dr. Jenner obtained lymph for vaccination, has yet been observed, as an endemic of our Valley; nor do I know of any instance in which the cow, having taken small-pox from the human subject, has given back the more benign vaccine virus. Hence that which has been used by us from North to South, has been derived from the Atlantic States, into which it had been brought from England. Its introduction into the West, was early in the year 1802, when vaccination began in Cincinnati and other towns of the Valley of the Ohio, in Western Pennsylvania, Western Virginia, Ohio, Kentucky, and Tennessee. The practice of vaccination has been coextensive with the spread of population between the Lakes and the Gulf; but while every new community has enjoyed its advantages, it has by no means been universal in any. Several causes have contributed to this failure, which it may not be unprofitable briefly to enumerate. 1. The remote and insulated condition of new communities in a wilderness, at once protecting them from invasions of small-pox, and depriving them of the requisite information as

to the preventive efficacy of vaccination. 2. The difficulty, which for the first twenty-five years, our physicians had to encounter, in providing themselves with vaccine virus. In a sparse population continued vaccination could not be maintained, and before the discovery that the vaccine scab might be employed, the infection brought from a distance was very often effete. 3. The objection made by many to adequate charges by their physicians; and then a fatal indifference about that which was offered to them gratuitously, or but for a nominal compensation, merely *because* it was so offered to them. 4. As a consequence of all this, ultimate apathy in many physicians towards the practice; want of care as to the quality of the lymph employed, and neglect to observe its effects,—numerous individuals never being revisited after the operation was performed. 5. An unworthy manifestation of personal dread of small-pox, by many physicians who had been vaccinated before, but especially since the first appearance of varioloid among us. 6. The absurd reasoning of many persons, that as cow-pox is not an *infallible* protection from small-pox, it is not worth while to resort to it.

To these, and other less general causes, we owe it that a large but unascertained proportion of our population have never been vaccinated, and the relative number is not likely to be diminished; for the occurrence of varioloid in later years, has, I fear, diminished the practice of vaccination in a greater ratio than the abatement of some other retarding causes might have promoted it. Under these circumstances, the question arises whether anything can be done to render the practice more general? I can think of no influence which could be brought to bear on the people in a *direct* manner to this end, but, perhaps, if a strong effort were made on our state legislatures, they might be prompted to certain enactments fitted to impart a general impulse to the practice.

1. As the militia are enrolled for the common defence, and as the small-pox introduced into an army liable to it, might at any time defeat the object for which it was taken into the field, it would seem to be not inconsistent with the principles of constitutional liberty, to require that all should be vaccinated. 2. Wherever public schools are established, it might be required as a condition to the admission of children of both sexes, that they shall have been vaccinated. 3. All charters for academies, colleges, and universities, might require the same condition. 4. To aid in the execution of such laws, it might be enacted, that the guardians of the poor, and the governors of all hospitals authorized by the states, should cause gratuitous vaccination to be performed in all cases where, through poverty, it might be demanded.

It may be asked to what good purpose would these regulations tend, if individuals are liable to small-pox after vaccination? I answer, that since the discovery of the vaccine disease, small-pox remains a scourge of society, not because the former is a fallible preventive, but because it is not univer-

sally employed. If all who are born were carefully vaccinated, small-pox would *probably* disappear, and certainly lose its mortal character, a result that should satisfy us. In support of the former part of this proposition, I may refer to the epidemic of Marseilles, France, in 1828. Of the unvaccinated, one half were seized with small-pox, while of the vaccinated, a fifteenth only were attacked. Now it is scarcely possible that any contagious disease would spread through the atmosphere, in a community of which only one person in fifteen was liable to it. It is in fact on the unvaccinated, that the responsibility rests of keeping alive and in mortal activity this frightful epidemic. But suppose this conclusion too broad, and that small-pox would survive universal vaccination, the latter clause of our proposition is unquestionable, for what would small-pox then be? One of our mild and least dreaded eruptive fevers, scarcely rising on the scale of mortality above varicella or urticaria. While the deaths at Marseilles from small-pox in the unvaccinated were one out of four cases; they were but one out of a hundred among the vaccinated. Again, in Philadelphia, in 1823–4, Drs. Bell and Mitchell,* saw of the former class, 85 deaths, out of 155, more than half; while of 64 of the latter class, but one died. And again, in 1818–19, Dr. Thomson, of Scotland, saw 50 out of 205, unvaccinated patients die, while of 310 who had been vaccinated, but one died! In the small-pox hospital of London, 1838,† out if 396 cases occurring among the unvaccinated, there were 143 deaths; and of 298 vaccinated, 21 died.

If we take the average which these statements afford, we find that of 4756 unvaccinated, 1278, or 1 in 3·72 died; while of 2669 vaccinated, but 43, or 1 in 62 were lost. Universal vaccination would then give us a disease, which destroys but 1·61 per cent. for one which kills 26·8 per cent. of its subjects. Now at Marseilles, out of 30,000 vaccinated persons, 2000 experienced small-pox, and if they had died at the rate of 1·61 per cent., which they did not, it would have given but 48·3 deaths for the 30,000, or 1 in 622. Such is the mortality of small-pox among the vaccinated. Most assuredly then, a disease which destroys less than a six-hundredth part of the population is not greatly to be dreaded, and such, as far as we can now judge, might small-pox be rendered by universal vaccination, should that disease then continue to prevail, which I think by no means probable. There are some disheartened by the occasional occurrence of small-pox in the vaccinated, who would return to inoculation, as affording a more infallible protection; but against this backsliding there are insuperable objections, for—1st. Inoculation, although a better protection than vaccination, is not infallible, and the mortality among those who subsequently contract small-pox, is greater than that among the vaccinated. 2d. Small-pox from inoculation, is on the whole a more fatal disease than small-pox following vaccination. 3d. The practice of inoculation tends to keep alive in the

* North American Med. and Surg. Jour. vol. ii. p. 249.
† Elliotson's Prin. & Prac. p. 436.

world, the disease which it is the object of vaccination to annihilate by depriving it of subjects.

II. MANAGEMENT.

Subjects.—When small-pox is epidemic the youngest infants may be vaccinated; but notwithstanding the disease may pass regularly through its stages, it will be proper to repeat the operation at a future time, as impressions on their systems at that early period may not remain unimpaired. Under ordinary circumstances the operation may be postponed to the second or third year. Persons of every age are susceptible. In the first year of the introduction of the disease into Cincinnati, I saw a lady ninety-eight or one hundred years old go regularly through it. In general it is more severe in the aged than in the young; and slower in its development. Those who are in bad health, or affected with any chronic disease of the skin, should not be vaccinated unless small-pox be prevalent; and all such should be subjected to re-vaccination when in better health. Some individuals, from idiosyncrasy, at every period of life prove to be insusceptible. When this is the case with adults, our efforts may cease after a few trials with virus fresh from the arms of different patients, inserted in different parts of the body, in various seasons of the year; but in the case of children, the operation must be repeated through a longer period in the hope that age may have rendered them susceptible. It might be supposed that those who are insusceptible to the vaccine, would be equally so to the variolous infection, but we must recollect that a violent epidemic small-pox has often affected a second time those who had once experienced that disease, and also reached those who had often lived through mild epidemics without having had an attack; showing that the system may be acted on by a concentrated or highly virulent infection, when a more dilute or feeble one fails, and suggesting therefore that an individual might resist the action of the vaccine and still be susceptible to the variolous contagion.

Vaccine Matter. — This should always be taken from the arm of a healthy subject, especially of one free from developed scrofula, from secondary syphilis, itch, tetter, lepra, and all other cutaneous affections. Inoculation directly from the arm should be preferred to the use of the scab, and the earlier the vesicle is opened the more active is the virus; but none should be taken from a vesicle that has been ruptured by violence, or from which matter has been drawn the day before, as even the puncture of the lancet may have modified the true vaccine action, and changed the character of the secretion. When therefore several patients are to be vaccinated from the same vesicle, they should be assembled at the same time and place. When a scab is used it should be solid, tenacious, of regular and circular form, and of the well-known mahogany hue.

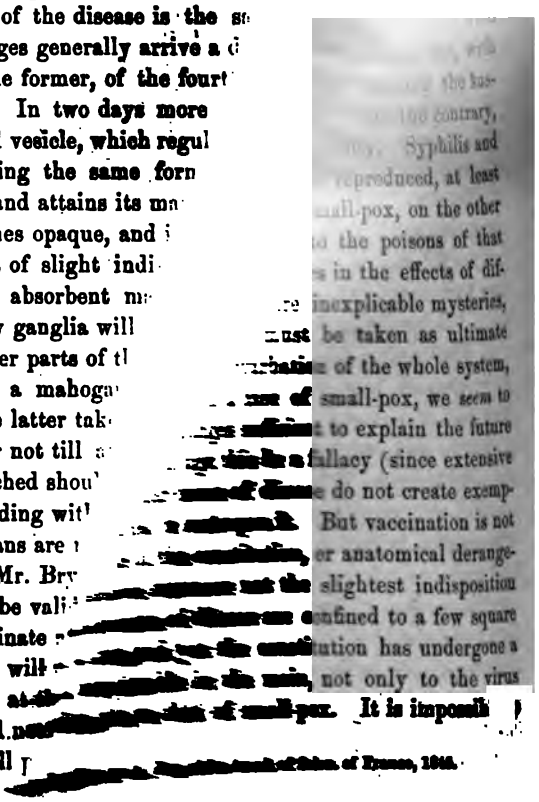
Operation. — As the great vascularity of the skins of children often

causes a flow of blood that washes away the virus and renders a
of the operation necessary, the part into which it is inserted sh
compressed between the thumb and finger, as to squeeze out th
should be held in that condition until the virus has had t
itself on the surfaces of the puncture. I am not prepared t
more than one insertion is necessary to the full preventive
ease; but as one puncture might fail and another succeed,
injured by external violence, or opened to supply lymph,
rable that the one on whose protection we rely, should
stages untouched, it will be proper to make two or mor
to accidents had better be on different limbs.

Diagnosis. — A premature development of inflar
tured part; an irregular figure of the vesicle; an ar
extensive; an early turbidness of the contents of t
nate dimensions; a want of regularity of form, coh
color in the scab; a deep and intractable ulcer
finally a broad, smooth, and unindented eschar,
with suspicion, and if any two or more of such
served, re-vaccination ought to follow.

The natural course of the disease is the s
but the successive stages generally arrive a
of the third day in the former, of the four
ing spot shows itself. In two days more
flattened and indented vesicle, which regul
elevation, still retaining the same form
areola is established, and attains its ma
the limpid fluid becomes opaque, and
of fever, and feelings of slight indi
selves. An inflamed absorbent m
cases, and the axillary ganglia will
vesicles appear on other parts of t
and the formation of a mahoga
The exfoliation of the latter tak
early as the middle or not till
from which it is detached shou
appearance, corresponding wit

Test.—Our physicians are
ineness proposed by Mr. Br
generally admitted to be vali
first operation, to vaccinate
constitution, the latter will
will arrive at maturity at
the first. If it should
sequent vaccination will



Revaccination.—We have already seen that a variable proportion of the vaccinated are liable to small-pox. This may be owing to several causes. 1st. The use of spurious cow-pock matter. 2d. Accidents to the vesicle. 3d. The presence in the skin or in the organism generally, of some morbid diathesis at the time of vaccination. 4th. The performance of the operation in very early infancy. 5th. A peculiarity of constitution of the kind which renders certain individuals liable to second attacks of small-pox. But after making due allowance for these causes, of which the last is no doubt most efficient, we are tempted by the number of attacks of small-pox after vaccination, to admit the probable existence of others. These it has been conjectured are the two following: 1st. A deterioration in the protective power of the vaccine virus from having passed through many human systems after being drawn from that of the cow, in the latter part of the last century. 2d. A loss, from the lapse of time, of the immunity from small-pox bestowed by vaccination. Both these conjectures deserve consideration.

1. I vaccinated myself in the year 1802, and engaged in vaccinating in 1803, with lymph, only five or at most seven years from the cow. I am now (1846), after the lapse of forty-four years, enabled to state that the phenomena and stages of the disease have undergone no change. The early and latter descriptions of it as found in the books are in fact identical. Now it seems extremely improbable that the vaccine disease should decline in its specific protecting power, without undergoing a change in its symptoms. Nevertheless, as this conclusion *may* be erroneous, and as it is contrary to the prevailing opinion of the profession, attempts to substitute a recent for the old virus ought to be encouraged. These efforts seem to have been more successful in Europe than America. The latest acquisition, I believe, was by Mr. Estlin, of Bristol, England, in 1838, who made it in a dairy near that city. It has been found more energetic than that in common use. I do not know that it has yet been introduced among us.

2. The opinion, that time destroys the immunity from small-pox bestowed by vaccination, is in all respects of deeper interest than the speculation we have just discussed. It is obviously impossible to decide this question *a priori*; and even experiment and observation have not led us to satisfactory conclusions. When an individual, after the lapse of a number of years, is seized with small-pox, the question will arise, unless he had been repeatedly exposed to its contagion, whether he ever had been protected? All that we know relative to the loss of immunity in early life, leads to the conclusion that children vaccinated in infancy are not liable to small-pox before the ninth or tenth year, and that but few lose their immunity till after the age of puberty. It is for the next twenty or twenty-five years from that epoch, that small-pox is most likely to attack them. After the thirty-fifth year, the exemption is generally perfect. This may perhaps in part arise from the diminished susceptibility to small-pox contagion in ad-

vanced life. Even throughout this period, however, individuals ma
infected during variolous epidemic visitations of an intense chara
is chiefly those which excite that disease in both the inoculated a
cinated. If an individual have lost the immunity bestowed by
can it be restored by repeating the operation? Experience a
answered this question in the affirmative. The symptoms a
the second disease appear not to differ from those of the fir
as a difference in age is concerned. The practical precept
cination may be thus stated.

If the child have undergone the operation in infanc
entertained for the next seven or eight years, that is, t
but if at the latter period a variolous epidemic shoul
revaccinated; if not, the operation should be postpo
the age of puberty, when it should be resorted to as
immunity which may, or may not have been lost.
tion take effect, and proceed with regularity, no
ployed; but should it fail, a third operation shou
period of adolescence is completed, that is, in t
second year, after which it need not be repeated

Theory of Variolous Exemption.—The whol
the fact that a salivation may be repeated
increasing facility; each invasion of mercu
ceptibility of the system to the action of t
opium and other narcotics rapidly destroy s
psora, depending on morbid animal pois
without any diminution of facility. A
hand, in general renders the system
malady for the future. These remarl
ferent active agents on our vital susce
which, in the present state of our k
facts. When we contemplate the vi
and the extensive lesions of the
behold anatomical and physiologic
immunity from that disease, and
disruptions of the organism in o
tion), still the mind is conten
followed by these perturbation
ments of the skin; in numer
follows, and all the manifest
inches of the surface of a li
change which renders it in
which produced the effect,

is

lymph, and others the
which I have been
In general, by the
the pustules have run
and those which came
capped summits of the
ep and indented scars
and cellular inflamma
attendant on natural
ence of the patient is
which are more violent
approach so nearly to

* Dr. Gregory, in Lib. of Med.

admit that this change is anatomical; and its production, independently of any physiological disturbance of which the observer is cognizant, or the patient conscious, is well fitted to excite our wonder and humble our scientific pretensions. It shows that there are depths in the living body where the sounding line of the physiologist has never yet reached bottom,—vital laws of which no interpreter has yet appeared. The hypothesis of Liebig, that the virus acts as a ferment upon some material in the blood, and destroys it, so that in a subsequent application of the same virus no effect can be produced, must be regarded as a most improbable fancy; for, in the first place, it is inconceivable that such a fermentation should not be attended with some degree of constitutional disturbance; in the second, the very existence of such an element is conjectural; in the third, if it exist, it is a normal element of the blood, and its consumption could not fail to be followed by injury to the economy, seeing that it was created for some end—had some part to perform in the functions of that economy. Thus we are driven, I think, to regard the nervous system as the tissue on which the poison exerts itself, and compelled to rest on some mysterious and transcendental change in the innervation, as the immediate cause of the immunity.

CHAPTER III.

MODIFIED SMALL-POX, VARIOLOID.—RELATIONS TO VARIOLA AND VACCINA.

When the eruptive disease to which this name is applied first began, by its epidemic prevalence in 1817 or '18 on to 1823, to fix the attention of the profession in Europe and the United States, three opinions of its character were entertained: one that it was varicella of unusual violence, another that it was a new eruptive fever, a third that it was small-pox occurring in persons who had been successfully inoculated or vaccinated. The last opinion has received the sanction of the profession, and is unquestionably the correct one; for, in the first place, exposure to small-pox will produce varioloid in some of those who have either had that disease or the cow-pox; in the second, an individual who has never had either will contract genuine small-pox from exposure to varioloid, or by inoculation with its virus; and, lastly, the analogy of symptoms is so great as to complete the demonstration.

It appears, then, that some of those who have undergone small-pox, and a greater number who have experienced cow-pox, remain or become liable to be acted upon by the variolous poison; but that their systems have undergone a change, which is the cause of a modification and decided mitigation of the disease produced by that poison. Hence we see that the same morbid animal poison (the primary source of which is unknown to us), is capable

an equal approach to natural small-pox; and some of them doubtless are that disease, although classed with varioloid, for all vaccinated persons do not have cow-pox.

Of the low mortality of the varioloid affection, I have already spoken, and when we take it into connection with the assemblage of mitigated symptoms here described, every candid mind must admit, that if *all* vaccinated persons were liable to it, the discovery of the immortal Jenner would still be a precious boon to the human race.

Treatment.—Little or nothing need be said under this head; as the treatment adapted to mild small-pox, is the most that can be required in varioloid. Indeed, many cases do not require the interference of art; and in all such, it is the duty of the physician to stand as a mere spectator, that the community may have evidence, founded on their own observation, that when small-pox does follow successful vaccination, it is not a disease to be dreaded. In proportion as they can be brought to distinguish between the suffering and danger of natural and modified small-pox, they will be inclined to resort to vaccination.

MISCELLANEOUS FACTS AND OBSERVATIONS.

Epizootic Small-pox.—Since it has been proven that vaccine infection is not specifically distinct from variolous, and that the cow inoculated with the latter generates the former, she may be said to be liable to small-pox. This suggests the question whether she originally contracted the disease from the human race, or from the same unknown source with ourselves? Analogy would lead us to suppose that the malady might have begun with her, as hydrophobia with the dog, and glanders with the horse, both of which are communicable to man. The accidental cow-pox on the hands of dairymen, which first attracted the attention of Dr. Jenner, was of a similar kind; but the intensity of natural small-pox does not permit us to regard it as of epizootic origin, that is, from the same fountain with the benign vaccine disease; while its occasional epidemic and malignant character seems to mark it as originating *de novo*, from some unknown and inscrutable agency. The same influence may have started it in the cow, or she may have received it from man. If the latter, the difficulty of propagating it to her is great, as most of the multiplied efforts made for that purpose have proved unsuccessful. In 1803, as hundreds have done since, I inoculated the teats of cows with small-pox matter fresh from the pustule, but it produced no effect. To what shall we ascribe these failures? May it not be that the animal, like ourselves, is subject to the disease but once, and that perchance those inoculated had already passed through an attack? Considered as an endemic of neat cattle, it may invade them much oftener than we are aware, not being recognized by us except when pustules appear on the teats.

Vaccine Infection from the Cow.—In the winter of 1845–6, a dairyman, of the neighborhood of Cincinnati, brought to Dr. Langdon some scabs

taken from the udder of one of his cows, telling him that others of the he[rd] had labored under the same pustular disease. The Doctor observed th[at] they were inclined to an oval shape, were deeply indented on the inner s[ur]face, and of a lighter color, less thickness, and greater roughness, than the vaccine scab from the human arm. Soon after receiving these scabs, the Doctor met with an unvaccinated family, which included seven children, lately from the country. Two of them, at the time, were out at service, but he vaccinated the other five. They all had the cow-pox. Their arms were rather more inflamed than usual, the axillary ganglia swelled, and they experienced more than the common degree of fever. The scabs which formed were the most beautiful and characteristic he had ever seen. He vaccinated from some of them, and distributed the rest among the physicians of the city. They produced the genuine disease, but it was not more intense than common. Soon after the family first vaccinated had passed through the disease, one of the children that had been at work from home, and was, therefore, not vaccinated with the rest, was seized with an acute fever, which, in three days, ceased, with the appearance of an eruption, which proved to be variolous, and passed regularly through all the stages of small-pox, which disease was at that time prevailing to some extent in the city. The recently vaccinated children continued in the same room with this patient, and all escaped the disease; but another person living in the same house contracted it.

Small-pox Propagated to the Cow without Inoculation.—The following fact was lately communicated to me by Dr. John F. Henry, of Burlington, Iowa:—

"BURLINGTON, Jan. 20, 1846.

"DEAR SIR:—I enclose you a portion of a scab obtained from a yearling calf nine miles west of this town. The history of the case is this: In the early part of December, some six or eight members of the family had the small-pox in the natural way. They had it badly, and one or two died. They lived in a cabin, and this calf fed about the door. When the people recovered, their clothes were washed, and the suds put outside, where, it is said, this calf drank of them. It is supposed that a cow also partook of the same delectable beverage. The animals were soon observed to be puny and moping, refusing their food, &c., and in three days an eruption appeared upon both, but especially the calf, which the family said 'exactly resembled small-pox.' As the family had just gone through the disease, it may be presumed they could form a very accurate opinion on this subject.

"I did not hear of this singular case until Saturday evening last. On Sunday, 19th, I rode out in company with Drs. Ransom and Lowe to examine the animals, and gather up such information as I could. We found the calf with marks in various parts of the skin, especially about the mouth and nares, shoulder, udder, and legs. Some of them resembled the tender

cicatrices which might be supposed to result from a variolous pustule. Others had still a scab on them; but whether *primary* or *secondary* I could not tell. In all the hair was denuded, and where the scab yet remained the true skin was elevated the one-twelfth of an inch. I carefully removed as much of the scabs as I could, and the portion now sent to you is some of the most promising.

"I have used it in one case, and intend trying it in others. Dr. Black, to whom I gave a portion of the scab, has used it in some twenty cases. The result is, of course, not yet known; but at the proper time I will communicate it to you. Having tried unsuccessfully, in Illinois, to infect a cow with variolous matter, I look on this infection in the *natural way* as a rare case, which deserves to be recorded and preserved. Should the scabs we have obtained produce in human beings the mitigated disease, with strong prophylactic powers, it will be eminently worthy of the attention of the profession, and I flatter myself may constitute an era in vaccination.

"I am, dear sir,

"Your friend,

"JOHN F. HENRY."

Small-pox Eighteen Days after Exposure.—As a fortnight is given in our standard works as a sort of maximum for the term of incubation, I am induced to state the following fact, communicated to me by a respectable medical gentleman of Ohio.

As an object of curiosity, he visited a man on the seventh day of the eruption in confluent small-pox, and spent an hour in his room, which was large and well ventilated. He was careful to avoid bringing his clothes in contact with the body or bed of the patient, and after leaving the house washed his hands in a brook. On his way back to the town in which he resided, he stopped and dined at the house of a friend and patient. A daughter of the gentleman, fourteen years old, sat opposite to him at the table, and was in the room a few minutes before and after dinner. She had a sort of erysipelatous inflammation on her face, which he was requested to examine, and over which he passed one of his fingers. This was on the 25th of April, and on the 13th of May she was seized with fever, which was followed by a variolous eruption on the 15th. I should not have thought this fact worth publication, but as a caution to physicians in reference to the spread of the disease by their professional visits.

Vaccination after Inoculation taking effect first.—In the year 1843, Dr. Fearn, of Mobile,* saw five negroes, ill with small-pox, taken to a plantation where there were many others who were unprotected. The huts of the whole were near together. He immediately vaccinated the unprotected; but not having confidence in the activity of his virus, on the fourth day afterwards he inoculated the whole with pus from the arm of one of the

* MS. Mem.

patients. The next day, having received fr... Orleans, he immediately vaccinated the same ... nation, with what proved to be effete virus. ... produced cow-pox at the regular time a... After the disease had run its course, the ... influence. A pustule formed on the arm ... stitutional disorder nor eruption. Not ... small-pox.

Vaccination during Continued ... Crookshank, of Harrison, Ohio,* w... pox, whose children, occupying t... It was not till four days after th... Doctor succeeded in obtaining ... cinated each of the children i... maturity between the sixth ... labored under a herpetic eru... moreover, escaped the smal... Each of the others, notwi... but not at the same ti... maturity nearly at the ... lent appearance ident... vesicle was furthest ad... latter in a milder f... died; but when ... beginning to sho... necessarily neg...

...from the Lakes to the shores ... town and country. The result ... frequently epidemic in the higher ...al; but these conclusions may be ...rger towns, the disease is more fre... ...and country. Some places seem to ... met with many physicians, of several ...ith, who had never seen a case. ...from the first settlement of the interior. ...and insulated communities of Kentucky ...last century, introduced by emigrants, or ...among them, *de novo*. From the tardy ...acy period, and the wide separation from each ...first settlements were called, the *presumption* ... does not appear that this malady makes ... and they are generally more frequent as ...populous. Dr. Hildreth* has observed ...of eight or ten years. The visitations of ...Louis have been more frequent. Although ...the year, this disease generally commences ...in spring, disappears in the course of the ...to a great extent in many of the north... ...as Dr. Estel informed me, at Canton, on ...a little further north, according to Dr. ... I visited those places, in September, it had ... and May, 1844, I found it extensively ...of Alabama and Louisiana. The length of ...a village is in some cases remarkable. Even ...Alabama, has seen it continue for a year. ...white, black, and red population in an ...are the most obnoxious, in violent ...seized. In the season last referred to, ...the Wade Hampton sugar plantation, ...negroes, one of whom appeared to be at

...Trans. of Ohio, May, 1839.

ghty, affected with the disease, in the midst of a great number of . It is impossible, I suppose, to decide with any certainty whether es are first or second attacks; in either case they may be regarded ating great energy in the cause.

gation.—While every physician has met with cases of measles could not trace up to others, either directly or indirectly, the gene- agation of the disease by infection may be received as an established he exceptions in the present state of our knowledge, like those pre- y scarlatina, mumps, and pertussis, are mysterious and perplexing. r the exhalations from the body of a patient before the appearance efflorescence will communicate the disease, is still an open ques- negative of which ought not to be assumed. Inoculation has to a extent been practised in measles. Blood drawn from the effloresc ing raised the disease in others; and the serum from minute vesicles ally found on the same surface has likewise been successfully em- but appears to be less certain. I do not know that the thin sero- secretion from the Schneiderian membrane has been tried. [Dr. employed a drop of the tears, as well as the vesicular fluid and blood. ulation failed in seven per cent. of the cases. In a very malignant occurring in Hungary in 1841–2, of upwards of one thousand successfully inoculated by Dr. Katona, not one died.] The uncer- these inoculations, and the little difference between the disease that way, and the ordinary mode of propagation, are likely to pre- culation from becoming general. The period of incubation in is said by those who have taken pains to collect and compare au- , to range from six to sixteen days,* but these are palpable ex- and the more common range is from the ninth to the twelfth day. aloosa, a young man came into Dr. Haywood's office, where there d to be a child with measles. Nine days afterwards, he was taken th the disease, which spread from him through the neighborhood, ly exempt. The period of incubation seems to be unattended with d of indisposition, and I do not know any required treatment; from the character of the disease, it would undoubtedly be proper contracting a catarrh.

toms.—These are substantially the same, both in the North and and so conformable to the descriptions found in European books, w that localities and modifications of society exert but little, if any, on the aspect of the disease, an evidence in favor of the theory of contagious propagation.

onset, measles may be characterized as an inflammatory catarrhal hered in by an irregular and protracted chill. The local symptoms, are those of coryza rather than pulmonary catarrh; such as sneez- nse of fulness in the maxillary and frontal sinuses, congestions of

* Library of Med. vol. iii.

the conjunctivæ, as of the Schneiderian membrane, and a profuse serous secretion from the whole. The glottis and larynx next become the seat of irritation, and a hoarse cough is provoked; lastly, the bronchial tubes become involved, and a pectoral cough commences, and sometimes becomes harassing and protracted—all of which is in the order in which many catarrhs and influenzas are developed. The cases described in the books, of measles without this affection of the aerial mucous membrane, I have not met with, nor have such been mentioned to me. It is, I believe, the opinion of those who have described them, that they do not protect against a second attack. The eruptive fever in this disease, is not, in general, very acute and inflammatory, and the pain of the back, limbs, and head, is less than in small-pox. The heat of the skin, sometimes considerable, is seldom intense. A comatose state in children occasionally attends on this stage, but convulsions appear to be less common than in small-pox. With the progress of the fever, the catarrhal symptoms are apt to become more violent, especially the bronchial. During this stage of the malady, the stomach is apt to become irritable, and vomiting is not unusual.

On the third or fourth day, rarely as early as the second, or later than the fifth, the rash makes its appearance. The fever does not then abate as in small-pox, and may even become more violent till the sixth or seventh day, when, if no internal complication should keep it up, it goes off. The rash begins on the forehead, extends to the face, which sometimes swells as in small-pox, thence it extends to the neck, arms, and trunk, and finally reaches the legs and feet. It appears in dots of a dark red, which are aggregated into patches, some of which are rudely lunate. They are very slightly elevated above the surface of the surrounding skin; and here and there present papulæ, some of which become vesicular; but the fluid is removed by absorption, and scabbing does not occur. I have repeatedly seen cases which, on the first and second day of the efflorescence, could not be told from the eruption of varioloid, in the corresponding stage of that disease. The catarrhal symptoms will then aid us in the diagnosis, but all doubtful cases should be held *subjudice*, as to mistake the more, for the less dreaded disease, would bring odium on the physician. By the time the rash has established itself upon the feet, it will have faded on the face; and by the eighth or ninth day will be gone from the whole body. As it declines, an exfoliation of the cuticle, in minute branny scales, takes place; in some cases so sparingly as not to be observed without close attention, in others abundantly; and during this process there is generally an itching of the skin. It has been said that the rash, after declining, sometimes reappears with a renewal of the fever. As measles and scarlatina often prevail at the same time, it may be asked whether this second efflorescence was not the latter disease? In the year 1820 or '21, I met with a well-marked case of that kind. The aspect and heat of the surface clearly marked it as scarlatina. When the efflorescence is at its height, the mucous membrane of the

fauces exhibits spots of a darker red, but ulceration does not take place. During the rash, or on its decline, a diarrhœa very often sets in, and sometimes continues as a troublesome symptom for several days. The eruptive fever and the cough should abate as the efflorescence begins to fade, if not before; and when either of them, or especially when both survive that stage, it is an evidence of internal difficulties presently to be mentioned.

When measles prevail during an epidemic typhous constitution, they assume a malignant character; and from the darker color of the rash, and the dark or livid hue of the mucous membrane of the mouth and throat, with or without petechiæ, have received the name of black measles. The pulse in these cases is unsteady and compressible; the efflorescence, premature or protracted in its outbreak, misplaced, partial, and prone to recede; the heat of the skin is often defective, and the signs of visceral congestion, thoracic, abdominal, or cerebral, are urgent.

Pathology and Pathological Anatomy.—We may presume that aeriform infection which produces measles, is inhaled in respiration; but is it absorbed? and does it act on the mucous membrane before its admission into the blood? The early appearance of catarrhal symptoms would seem to suggest an affirmative answer to the latter of these questions, but as they are not present in "natural" small-pox, which may be supposed to be produced in the same manner as measles, a sounder conclusion is perhaps that the infection is absorbed. In whatever mode or on whatever part its impress is made, a certain time is necessary to the development of its sensible effects. Of the insensible changes in the innervation or the blood which it works out during that period we know nothing. They are the efficient causes of the fever and catarrh (which arise simultaneously), while the efflorescence seems to have for its antecedent the fever. In this, however, as in most other diseases, our rationale of the symptoms is little better than a statement of their relations in time to each other. The rubeolous poison is then an efficient noxious agent, which produces a series of morbid actions in certain organs and tissues. Some of these, as the congestion of the mucous membrane of the anterior part of the respiratory apparatus, the fever, and the cutaneous rash, are always present, and constitute the essential elements of the disease. Others are accidental, and consist principally of congestions and inflammations of the lungs, the bowels, the brain, and the ears. In these organs we find the sequelæ of the disease in protracted cases and the lesions of structure after death, whether it occurs early or late in the attack. When none of these accidents or extensions of the disease beyond its necessary limits arise, the case, although the legitimate symptoms may be intense, seldom proves fatal, as having run their course they subside independently of the assistance of art. The prognosis of a case is bad then, in proportion not so much to the violence of the legitimate symptoms, as to the want of their regular development, or to their extension beyond the proper limits. Thus a severe coryza, a hot fever, and a

acute and inflammatory, ...period; but oftener it assum... than in small-pox. Th... ...eræmias and ulcerations of th... intense. A comatose ...ngiia. The brain appears ... but convulsions appe... ...ne ears sometimes become i... progress of the fev... ...uppuration in the external a... lent, especially th... ...inflammation, especially in a... is apt to become ... ...orm, and constitutes one of the...

On the third ... ...athological state of the system... fifth, the rash ... ...pear or recedes deserves great at... small-pox, and ... ...t. The inflammatory orgasm may b... when, if no ... ...commonly in the lungs, may... begins on th... ...ay be prevented, in whole or in ... small-pox, t... ...and livid character, from deficient c... the legs a... ...conditions of course require oppo... into pat... ...people and routine physicians they a... elevated ... ...Measles and scarlatina sometimes prev... present ... ...modify each other; but I shall reserv... by ab... ...ve treat of the latter affection. which ... ...pidemics, the duty of the physicia... from ... ...n of the case. Abstinence, diluent ... Th... ...and aperient, constitute the appropriate ca... ...ases, the interposition of art has for it... d... ...but the preservation of the patient... ...enumerated. When the eruptive feve... ... ...a single venesection, and the free admi... ... ...cathartics, of which I believe the b... ...and nitrate of potash, form... ...seen full vomiting followed by

terfere with the development of the rash. We have already seen that with its appearance the fever does not cease, and that in some cases its intensity increases. At the same time visceral, especially pulmonary, inflammations are set up, or if previously existing become more intense. Venesection and other antiphlogistic measures are not, therefore, to be limited to the stage which precedes the appearance of the eruption, as in small-pox, but may be required at any subsequent period. In other cases the cutaneous excitement and that of the system at large are too low to favor the explosion on the skin. The blood accumulates within, and anxiety, oppression, and dyspnœa, with a feeble and rapid pulse, and a dark and cool state of the surface, are present. These are the cases which demand a stimulating treatment; and without it the patient may die. A warm stimulating bath and a mustard emetic are now of signal service; hot herb teas, of which in popular belief, saffron is the best, are also beneficial, especially if paregoric be added; wine whey and ammoniated alcohol, may likewise be employed if the powers of the system should flag to an alarming degree. The capillary circulation being re-established, and the rash appearing with the ordinary floridness, a further administration of stimulants will be unnecessary, and even injurious.

When the gastric irritability is very great, an epigastric sinapism or blister is of signal benefit. The diarrhœa sometimes requires particular attention. An active cathartic of ten grains of calomel or blue mass, ten of rhubarb, and one of ipecac., may be followed by a tranquil state of the bowels; but in many cases a pill of opium and ipecac., at bedtime, or the cretaceous mixture, with laudanum after each evacuation, will be necessary. As the diarrhœa, however, seems, in many cases, to preserve the lungs from inflammation, the physician should rather aim at restraining than too suddenly checking it.

When cerebral congestions productive of coma occur, the lancet, or adequate leeching and free purging, are required.

It is, however, to the lungs that the physician should direct the most vigilant attention. In every stage of the disease, passive or active hyperæmias are apt to supervene, and, if unsubdued, prove immediately fatal, or continuing, eventuate in mucous ulceration, parenchymatous induration, pleuritic adhesions, or abscesses. The existence of pulmonary engorgement, or actual inflammation in any of the tissues, must be ascertained by the modes of investigation to be pointed out under the appropriate heads. To relieve the former an emetic is of much power. It may be followed by dry cupping or blistering. Actual inflammation will require the lancet—when the blood will generally be found sizy—scarification with cups, and subsequently blisters. Nauseating doses of tartar emetic, neutral salts, diluents and demulcents, with opiated sudorifics in the decline, will be proper. A violent inflammation of this kind may arrest the development of the rash, or cause its retrocession, when the stimulants usually administered by the people to promote or restore it, may prove to be the cause of death.

The confidence of the people in their treatment of this malady results from its self-limited character, and its general freedom from a mortal tendency. An intelligent lady once sent for me to visit her children, and wished me to tell her whether they had the measles, adding that she could not decide, *but knew how to cure them, and preferred to use her own remedies.*

I have not seen an epidemic of malignant measles, and am disposed to think it almost unknown in the Valley. As the visceral engorgement and reduction of the vital forces are great in this variety, depletion from the bloodvessels can only be employed at the beginning, and then to a limited extent. Blistering may do good, and a stimulating emetic is admissible. But much reliance should be placed on tonics and stimulants. An acidulated decoction of bark; opiates, wine-whey, wine, whiskey, or brandy; infusion of serpentaria, camphor, ammonia, nutritious diet, and stimulating baths to the skin, are the means most likely to carry the patient safely through.

On the whole the period of greatest danger in measles is that of convalescence. After the fever and rash have subsided, the circulation is peculiarly liable to lose its equilibrium under an exposure of the surface of the body to a cool and damp atmosphere. In common with other physicians, I have seen many sudden deaths from this cause. The blood is repelled from the surface, which suffers great reduction of temperature, and assumes a dark or livid hue. It simultaneously accumulates and stagnates in the vessels of the brain, the portal organs, or the lungs and heart, producing fatal oppression, accompanied by convulsions, or incessant vomiting, or distressing dyspnœa, according to the seat of the engorgement. At the same time the pulse is weak and fluttering; and the signs of general debility extreme. The single indication of cure in this condition is derivation from the oppressed organ, and restoration of the peripheral circulation. In some cases a single bleeding, or scarification and cupping may be employed, and dry cupping may also do good. But our chief reliance should be on counter-irritation. A general and highly stimulating hot bath; subsequent hot and irritating pediluvia; and the application of sinapisms or blisters to the parietes over the affected organs, are the measures upon which we should chiefly rely. When the local affection is beneath the diaphragm opium will be proper; and in all cases stimulating diaphoretics will co-operate beneficially with the external treatment. On the whole, however, the successful treatment of these cases is so difficult that we cannot too earnestly recommend to our patients an avoidance of the exposure which produces them. Exposure does not always produce the effects which have been described; but occasionally awakens in some of the pulmonary tissues a subacute inflammation, which may go on to fatal organic lesions; or a chronic diarrhœa eventuating in mucous ulceration, or glandular congestions and abscesses in those who are prone to scrofula. On the whole perhaps the management of a case of measles after the rash has faded, is as important as in any previous stage.

SUPPLEMENT.

Epidemic of 1813.—As a supplement to this chapter, I propose to transcribe from my common-place book, a summary of the first severe morbillous epidemic which I ever witnessed in this place (Cincinnati). Ten or twelve years before, a similar one had occurred, but with less severity, than that of 1813.

"The following were its general characteristics:—

"1. In the months of February and March, there occurred several severe and protracted cases of pulmonary inflammation; and a number of deaths among those who labored under chronic diseases of the lungs. There were also many cases of sore throat (*angina tonsillaris et pharyngea*), some of which were accompanied with fever, and some with slight ulceration of the mucous membrane.

"2. The measles began to appear about the middle of March, and were at their height in May and June, after which they declined, but did not disappear till November.

"3. A great number of persons were attacked who had escaped repeated exposure to the infection before, and some are said to have had the disease a second time, which induced a number of persons to suppose the epidemic not to be measles.

"4. The fever attending it was as usual of an inflammatory kind.

"5. In a few cases the eruption appeared without any previous indisposition.

"6. In many cases, the rash terminated without any production of branny scales.

"7. Redness of the throat with small ulcers were common, and many had this affection who had already passed through the measles, and were not otherwise indisposed.

"8. In the months of March and April, a diarrhœa generally accompanied or followed the disease. In May, June, and July, the dysentery took its place, and sometimes proved fatal.

"9. In several instances severe inflammation of the lungs occurred, and in one terminated in empyema.

"10. In a number of families, a part only of the members liable to the disease were seized with it."

Severe Affection of the Brain in Measles.—Dr. Sprague,* of the State of Michigan, in 1844, saw an epidemic in which the signs of cerebral congestion and inflammation were greatly developed in almost every case. A *majority* of the patients died.

* Western Lancet, vol. iv. p. 298.

CHAPTER VI.

SCARLET FEVER—SCARLATINA.

SECTION I.

HISTORICAL NOTICES.

A MALIGNANT form of scarlatina seems to have invaded the first settlers of Kentucky and Ohio, concerning which, however, but little is now known. Even the exact period cannot be stated, but it was between 1791 and 1798.* In Kentucky, where it was extremely fatal, it was universally called "putrid sore throat," as it was probably unattended with much efflorescence. At Marietta and Bellpre, the oldest settlements of the State of Ohio, it was most dreadfully destructive among children and young persons, attacking and destroying nearly all the former. Five or six in some cases died out of a single family. In many instances parents lost all they had. It is worthy of remark that at the time of this epidemic, the country was an almost unbroken forest, the immigrants lived in open cabins, and subsisted on a simple diet, very often deficient in quantity.

From the time of this epidemic till the year 1808, I do not know that any form of scarlatina appeared in the valley of the Ohio. In that year cases of the anginose variety began to show themselves in Cincinnati, and the disease prevailed more or less for two or three years. About the same date, Dr. Hildreth, who had immigrated to Marietta a few years before, observed the fevers to be of a "highly putrid" or malignant type; no actual scarlatina, however, occurred at Marietta till 1824, when it appeared in the anginose form. Three years before, 1821, it had broken out in Paris, Kentucky,† as a malignant sore throat, being unattended with a rash. Dr. Warfield regarded it as a new disease in that quarter.

Since these dates, that is for the last twenty or twenty-five years, it may be regarded as one of our endemics, having, as I suppose, at no time been absent from the Valley of the Mississippi and the Lakes; though many localities may not have been visited, while others have experienced repeated invasions. To trace them out would be a hopeless task, as the histories of most of them have not been written. On the whole, they have been far more frequent and fatal in the middle and northern than the southern states. Dr. Callaghan‡ has published an account of an exceedingly fatal invasion at Pittsburg, Pa., beginning in the month of May, 1830, and ending or abating

* Drake's Notices Concerning Cincinnati, 1810. Hildreth, MS. Mem. Also, in West. Jour. Med. and Phys. Sci. vol. i.

† Dr. Warfield in the West. Jour. vol. i. for 1827.

‡ Amer. Jour., New Series, No. 15.

in the following January. Dr. Carroll* has described the disease in an epidemic form, complicated with erysipelas, at St. Clairsville, Ohio, in 1833. From 1828 up to that time, it had prevailed, he tells us, in various localities in the southeast part of Ohio, around St. Clairsville, and proved extremely mortal. Dr. Dawson† has described it as occurring in Green County, Ohio, in 1838–39 and 40. No case, he remarks, had been observed in that quarter for six or eight years before. It took on the simple and anginose forms. Dr. Lawrie‡ has given an account of its prevalence in the latter variety in Calloway County, Kentucky, in 1838. Dr. Reyburn§ has reported many cases of an epidemic in St. Louis, in 1845. They were generally of the same type with the last.

These published accounts, however, give but a faint idea of the extent to which scarlatina has prevailed among us for the last quarter of a century. In my personal intercourse with physicians, I scarcely conversed with one north of the 33d degree of latitude, who had not seen the disease epidemic once or several times, though many south of that parallel had never met with it.

Origin and Spread.—The malignant scarlatina of 1791–3, can scarcely be regarded as an introduced disease, for the reason that it prevailed in new settlements detached from each other, and so distant from the Atlantic States, as that the migration to them was a labor of many weeks. I recollect, indeed, that the physicians and people of Washington, then a principal town of Kentucky, regarded the epidemic as depending on the state of the atmosphere, which, it was *said*, was such as to cause a rapid putrefaction of fresh meat, when elevated and freely exposed to it. In this reminiscence, there is of course no other value than that of showing that the disease was not considered as having been imported from abroad. Indeed of its introduction into most of the localities in which it has prevailed, we absolutely know nothing. I have never been able to trace up a single visitation at Cincinnati to importation, by patient or families; nor as far as I know, has a case of that kind been clearly made out. When the disease begins in a town or country neighborhood, it has, however, generally prevailed for a while in some other not very distant; but of the connection between the two epidemics, in the relation of cause and effect, we have very little exact knowledge. If propagated from one to the other, the fact is generally enveloped in obscurity. Prevailing for several months or a year in one place, the people of surrounding places, although maintaining the usual intercourse with it, will remain exempt. At length, however, having exhausted its subjects, it appears in some neighboring village; exciting our wonder that an atmospheric contamination should not have occurred in both at the same time; or that if infectious, it should not have spread thither at an earlier period. When it appears in a family, it seldom attacks all the

* West. Jour. of Med. and Surg. vol. vi.
† Ibid. vol. v.
‡ Ibid. vol. ii.
§ St. Louis Med. and Surg. Jour. vol. iii.

liable at the same time, but more commonly does so progressively; while one child, in each of a number of neighboring families, may be seized simultaneously. Presenting such habitudes, we need not be surprised that our physicians, like those of other countries, differ in opinion as to the mode in which it propagates itself. A part believe it never infectious—another part regard it as appearing and spreading solely by infection—a third, and larger portion, consider it to originate *de novo*, but to be capable of propagating itself; and the truth *probably* lies with them. I do not know that the experiments by which, in Europe, the disease has been propagated by inoculation, have ever been repeated in the Valley.

Seasons, Subjects, and Varieties.—Scarlatina is less limited to a particular portion of the year than measles, and seems not to prefer the first six months over any others. Indeed it generally prevails less in spring, than in summer, autumn, or winter, presenting in this respect, a kind of antagonism to measles, though the two have often prevailed at the same time.

In this, as in other countries, its subjects are generally children below the age of puberty, especially under the tenth year. In early life, both sexes appear to be equally liable; but in middle life, women are more susceptible than men.* In old age, the liability to this disease appears to be less than to measles. As a general fact, it affects the individual but once; to this, however, there are many exceptions.

In common with all other epidemics, scarlatina presents varieties which are at the same time grades of intensity; but it goes beyond all others in its degrees of danger. Simple scarlatina is almost unattended with any pharyngeal affection, and is equally free from danger. Anginose scarlatina involves both the skin and the mucous membrane of the throat, and is much more severe and mortal. Malignant scarlatina leaves the former almost unaffected, and concentrates its local manifestation on the latter. The first of these grades or varieties scarcely demands medical treatment—the last almost sets it at defiance. Of the causes or conditions which determine these remarkable diversities of phenomena and danger, we are entirely ignorant. They often occur simultaneously in neighboring localities.

Symptoms.—The histories of this malady presented in European works, and in the writings of our brethren of the old states, apply with but little modification to the disease as it prevails among us, both in the North and South. As we have just seen, these histories embrace three varieties, of which I shall proceed to give the characteristic symptoms.

1. *Scarlatina Simplex.*—Many cases of this variety are so slight, that the patient continues on his feet throughout the attack; but the more decided cases are ushered in with a smart chill, succeeded by early reaction, a hot skin, considerable thirst, and a feeling of heat in the mouth and throat. During the chill, nausea and vomiting sometimes occur, and in the reaction, delirium is not uncommon. The fever does not cease like an ephemera,

* Library of Medicine, vol. i.

though it may display some remission, and then become still more intense on the second day. In many cases the rash now appears, and is rarely deferred beyond the third day, the fever, as in measles, continuing unabated. I have generally seen it visible on the upper part of the breast before any other part, whence it extends to the arms and face, and thence, within twenty-four or thirty-six hours after its first appearance, over the surface generally. The bright red dots rapidly multiply, and by an apparent coalescence, large patches of skin soon assume a uniform scarlet hue. To the eye, there is but little elevation of the parts which are thus overspread, but the hand will often detect a papular eruption, and minute vesicles are not uncommon. In this stage of the disease, the heat of the skin is often considerably above that of ordinary fever; and the uncomfortable feelings of the mouth and throat are aggravated, the papillæ of the tongue becoming prominent by sanguineous injection. On the fifth or sixth day the fever begins to abate, the efflorescence fades, and an extensive desquamation of the cuticle is followed by immediate convalescence; in the progress, or after the apparent completion of which, however, anasarca more or less extensive, may supervene, and continuing for a short time, pass spontaneously away.

2. *Scarlatina Anginosa.*—As measles are ushered in with a "cold in the head," so this variety of scarlatina is accompanied, sometimes indeed preceded, by a quinsy. A tendency to this is perceptible even in the mildest forms of simple scarlatina; its full development, as a specific inflammatory congestion of the mucous membrane of the mouth and throat, often extending to the subjacent parts, constitutes the diagnostic distinctions of this form or grade of scarlatina as compared with the other. Of course cases constantly arise which may be regarded as violent grades of one or mild grades of the other; and be referred to either head according to the arbitrary decision of the physician. In general, the fever is more intense, the efflorescence more universal, and the heat of the skin more elevated in this form than the other. In fact, we know of no other disease in which the temperature of the surface rises so high, many different observers having seen it at 108°, 110°, or even 112° of Fahrenheit. The rash, in this variety, is generally one or two days later in appearing than in the simple variety, is seldom so universal, and often partially recedes and reappears. The organic oppression, restlessness, delirium, and prostration, are in most cases very great. When inspected, the mouth, palate, tonsils, and pharynx, are found of a deep red, sometimes presenting spots of a purple hue, and others which appear like sloughs, but are removable, and held by the best pathologists to be composed of coagulable lymph, thrown out by the intensity of the inflammation. Ulceration is, in fact, not a common occurrence, nevertheless it sometimes occurs. Several years ago, I saw a case in which it attacked the base of the epiglottis, and during convalescence that organ, nearly detached, was drawn into or upon the rima of the glottis in such

manner as to produce suffocation and immediate death; the cause of which was ascertained by *post-mortem* inspection. The tongue, in this condition, is sometimes swollen, its edges are red, and its papillæ, in a state of tension, project through the white fur which covers its surface. The tonsils and uvula often swell so as to obstruct deglutition, and the former sometimes suppurate. The swelling and inflammation extend to the adjacent parts, involving the sublingual, submaxillary, and parotid glands, and sometimes the cervical ganglia; the muscles of mastication and swallowing participate in the inflammation, and those functions become impaired. A tenacious secretion covers the surface of the alimentary membrane, and subjects the patient to much inconvenience. But these lesions as seldom extend to the respiratory apparatus, as do those of measles to the digestive. Appearing before the efflorescence, these anginose affections generally survive it, though they begin to abate as it begins to fade. As long as they continue, some degree of fever generally lingers in the system. Now and then cellular or glandular suppurations about the neck, or in the auditory passages, prolong the sufferings or discomforts of the patient, and protract his convalescence. When leeches have been applied, the bites now and then ulcerate, and produce troublesome sores. Among the permanent lesions of the throat, though of rare occurrence, is obliteration of the Eustachian tubes by adhesive inflammation.

Thus far we have dealt with the necessary or essential symptoms of the disease; it remains to speak of its accidents and complications. These are found in all the great cavities, the organs of which may be either oppressed and irritated by extensive congestions, or experience actual inflammation, which, according to Dr. Tweedie,* is much oftener in their serous than in their mucous or cellular tissues. In this country the mode of fatal termination presented by the disease, indicates it to be oftener from affection of the brain than any other organ. A large proportion of those who are lost die of convulsions in an early stage of the malady, or with manifest affection of the brain at a later period. In an epidemic at Edinburgh, however, Dr. Hamilton† found that death was generally preceded by an extension of the disease to the larynx, trachea, and lungs.

3. *Scarlatina Maligna.*—In this variety—the putrid, ulcerous, or gangrenous sore throat of the older writers—the hot inflammatory fever, which has been described, is replaced by one of a low, adynamic, or typhous character, presenting the signs of debility and cerebral disturbance which characterize that form of fever. The efflorescence is sometimes entirely wanting. In the epidemic which Dr. Warfield has described at Paris, Kentucky,‡ it did not appear in a single case. In none does it show itself as early as in the other varieties, and in all is partial, of a darker or paler red, and prone to recede. In some cases petechiæ appear; the high tem-

* Cyclopæd. of Pract. Med. † Libr. of Prac. Med. vol. i.
‡ West. Jour. Med. and Phys. Scien. vol. i.

perature of the skin is not developed, and the heat of the extremities is often below the proper standard. The throat affection is nearly always the first part of this disease, and in some epidemics has preceded every other symptom for several days. Instead of the florid redness of the mucous membrane, a dark or livid hue prevails. The tongue speedily becomes brown, smooth, and cracked. Aphthæ occasionally appear in the mouth; its secretions and those of the throat are offensive to the smell, and often acrid; sordes adhere to the teeth; ash-colored spots appear on the curtains of the palate and the tonsils, which, in some cases, are adhesive mucus, in some exudations of lymph, but in others sloughs. Occasionally the parts assume a gangrenous tendency, and extensive sloughing throws off the dead portions, or the patient sinks under the mortification. At other times, hemorrhages from the mouth or nostrils occur, and occasionally regurgitations of food or drink through the latter, when the patient attempts to swallow. As in the preceding variety, swellings, and sometimes suppurations, of a most vitiated kind, occur in the glands or cellular tissue about the throat and ears. The periods at which death occurs in this variety are very different. It often happens as early as the second or third day, and may not occur for as many weeks, during which the utmost efforts of art to change the mode of morbid action and support the vital powers will produce little or no effect.

Scarlatina Faucium.—It has been long known that persons who have had the small-pox are liable, while nursing variolous patients, to experience a few pustules without any constitutional disturbance. In like manner, when scarlatina is prevalent, many persons suffer a sore throat without fever or efflorescence. I have not seen the disease epidemic without meeting with cases of this kind. They constitute the scarlatina faucium of European writers. In St. Louis, Dr. Reyburn saw many instances of this affection, "attended rather with nervous malaise, than with vascular disturbance."

Prognosis.—It is an admitted fact, that scarlatina, commencing in the simplest and mildest form, may, without any assignable cause, suddenly assume a fatal character; and this may happen with individuals, while hundreds around them are passing safely through the disease. A general character of mildness cannot then be made the basis of a favorable prognosis. A prevailing floridness of the skin, with early and extensive rash, augurs favorably, while a dusky hue, petechiæ, or pallor, are ominous. A quiet state of the bowels is auspicious. Dr. Dawson (*loco citato*), observed that cases in which diarrhœa occurred invariably proved fatal. Dr. Reyburn remarks, that cases which, in the beginning, were attended with a full, round, active, and even strong pulse, did well, while those in which the pulse was contracted, small, and sharp, proved severe and dangerous. Dr. Warfield (*loco citato*), repeatedly witnessed that the preservation of the muscular strength is no guarantee of recovery. His patients sometimes

continued to walk about till within a few hours of death. Children are more likely to recover than adults, and men than women, especially those who are pregnant or in a puerperal state.

Complications and Consequences.—In winter and early spring affections of the lungs and pleura are most apt to supervene on scarlatina; in summer, the complications are oftener abdominal,—thus showing the influence of the seasons in modifying the character of disease which arises independently of them. When measles prevail, the two exanthemata reciprocally modify each other, of which we shall see proofs hereafter. Epidemic erysipelas also unites itself with scarlatina,—a combination to be considered under another head.

The consequences or sequelæ of scarlatina may be inferred in part at least, from its symptoms as already detailed. They consist largely in chronic inflammations of the eyes, salivary glands, or lymphatic ganglia of the neck; in suppurations of the internal or external ear, the latter continuing in a state of ulceration; in obliterations of the lumen of the Eustachian tube already mentioned, and sometimes in partial or total deafness. When the individual was predisposed to scrofula or phthisis, that disease may be quickened into action. In some cases abscesses of the joints are added to the catalogue of ills. An inflammation raised during the disease in any of the viscera may remain, and go on to disorganization of the tissue in which it is seated. As we have already seen it prefers the serous, but the mucous membranes do not escape, and a laryngeal or bronchial cough, as well as diarrhœa, are among the consequences we are enumerating. The most characteristic and formidable consequence of this eruptive fever, however, is dropsy; generally of the cellular, but sometimes of the serous kind. It appears to be limited to the more inflammatory varieties of the disease, and only appears in a small proportion of them. Although placed among the sequelæ of the fever, it has occasionally occurred and proved fatal within the first few days; in general, however, it shows itself in twelve, fourteen, or more, after the commencement of the attack. I have never seen it but as a moderate and transient anasarca, commencing generally in the face; but in Europe it has frequently occurred in the form of ascites, hydrothorax, and hydrocephalus, when it is apt to prove fatal. The urine in these dropsies abounds in albumen, being coagulated by heat and the mineral acids.

Morbid Appearances.—When patients die in the first days of the fever, it generally happens that no lesions of structure are to be found. Time is necessary to their production. The vital powers are overwhelmed by the impress of the poison, or the functions of some great organ have been arrested by an accumulation of blood, which has receded while the patient was *in articulo mortis* or after death; or, as Dr. Tweedie* conjectures, the virus may have wrought in the blood a change incompatible with the continuance of life. In evidence of this he has observed that the skin in these

* Cyclop. of Prac. Med. vol. iii.

cases runs rapidly into putrefaction. Internal lesions of structure are not wanting, however, in cases which have continued a little longer; and those in the form of hyperæmias, and serous or sero-lymphatic effusions are often found in the brain. The throat presents congestions of its mucous membrane, with deposits of lymph, and the tonsils are swollen; in one epidemic, Dr. Hamilton, of Edinburgh, found a similar condition of the mucous membrane of the respiratory apparatus. Now and then the peritoneum shows signs of inflammation, and occasionally the mucous membrane of the bowels. An involvement of the kidneys is only found in cases which continued beyond the usual period, and especially where death had been preceded by dropsy; the aspect they then present is mottled and granular.*

Prevention.—It may with truth be said, that scarlatina is either not infectious, or that its infection, although it may not be abundant and diffusive, is remarkably adherent to the fomites which imbibe it, for cases are reported which require us to adopt one or the other of these alternatives. Would we then prevent the spread of the disease? We must bear in mind the great length of time which is required to detach the infection from houses, furniture, and clothing. This can only be done by free ventilation, and a liberal use of hot water, for we know of no chemical agent which can decompose the poison.

As a means of rendering the system insusceptible to the action of the virus, and thus preventing the disease, it was some time since proposed in Germany, to administer belladonna, continuing it for some time in minute doses. The sensible effects of this administration are said to be an efflorescence or rash resembling that of scarlatina, with a slight affection of the pharynx, mouth, and salivary glands. These symptoms, however, are not constant, and it is said are not necessary to the preventive effect of the medicine. The German formula, is water, one ounce, extract of belladonna, three grains, mixed; of which solution three drops are to be given twice a day to a child under twelve years, and an additional drop for each year over that age. I must confess that I should have little faith in such doses, and know from experience that much larger ones, may be administered with safety. Dr. Burrows has given a sixth of a grain three times a day. As yet but few experiments on this prophylactic method have been made in the Valley of the Mississippi. In no case in which I have tried it has the imitative rash appeared, or the real disease; but the number of cases has not been great enough to justify a conclusion. Dr. Logan,† now of New Orleans, gave a considerable trial to the prophylactic, while in Charleston, South Carolina. Five grains of the extract in an ounce of cinnamon water, was his formula, of which solution, five drops were given night and morning to a child, at or under three years of age, adding a drop for every year above that age. In a few of the patients it produced a slight redness of the fauces and lips, with a faint efflorescence about the throat and cheeks.

* Library of Med. vol. i. † New Orleans Medical Journal, vol. i. p. 60.

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which it is seated. As we [illegible] would leave permanent infirmity. To
mucous membranes do [illegible] be conferred by art? A satisfactory
as diarrhœa, are anxiously [illegible] perhaps, be given. Some physicians rely
characteristic and [illegible] some on cathartics, others on ice or cold
is dropsy; general [illegible] those on the *medicine expectante*;
appears to be lit[illegible] adopted to be that which conducts the
only appears in [illegible] disease, while in fact the diversity bears
sequelæ of th[illegible] of the whole, and justifies the question,
the first few [illegible] have been the same, if nothing had been
or more, af[illegible] recovered, would not have done so if they
as a mode[illegible] whether those who died under one method of
but in [illegible] under any other? In other words, are
and hyd[illegible] our methods of treatment introduce, of a
abound[illegible] of recovery, or to increase the danger of
Mo[illegible]
it ge[illegible] no doubt be left to nature, allowing
nec[illegible] a bountiful supply of pure water and
im[illegible]
ar[illegible] the urine is decided, the fever burning,
w[illegible] strong temptations to the interference of
v[illegible] should not be signs of inflammation in
[illegible] treatment may be limited to cool

* [illegible] Jour. vol. iii. p. 346.

air, and cool water applied to the surface, with ice about the throat. The remarkable morbid activity of the calefacient function in such cases suggests these refrigerants, which can never do harm unless there should be an (undetected) inflammation of the lungs, while they certainly contribute much to the comfort, if not to the ultimate safety of the patient. In the management of these cases, however, we are apt to add to these simple antiphlogistics others of a more artificial character, which affect the constitution far more deeply. It is proper to consider them separately.

1. Bloodletting. Although employed by many of our physicians, the experience of the majority tallies with my own, and goes to prove that venesection is of uncertain benefit. I have bled little patients till they fainted (a practice that should not be imitated), and seen them die afterwards. In such cases, the vital forces are reduced, but the vital actions are not changed, and the systems of children are rendered irritable, thus increasing the danger of spasms, internal congestions, and revulsions from the surface. The older the patient, the less is the probability of these sinister effects from copious venesection, and the greater the probability of advantage. A second venesection can hardly ever be required, and is seldom admissible, unless an acute internal inflammation has supervened in a vigorous constitution. Even then no experienced physician expects to find in venesection the resource which all experience shows it to be in the acute inflammations of the same parts from common causes. Nor is it equally valuable in every epidemic. Thus the first time that Dr. Ames saw it prevail at Montgomery, Alabama, bleeding was generally employed, and little else done, and every patient subjected to it recovering; but in a subsequent epidemic it failed.

If local bleeding is of less efficacy than venesection, when the organism at large is to be influenced, it commends itself to us as a means of relieving topical affections, and may often be employed when general bleeding is inadmissible. If the brain should be specially affected, leeches may be applied to the temples and nucha: if the anginose symptoms be urgent, or otitis, ophthalmia, or parotitis, should supervene, leeching or cupping on the back of the neck should never be neglected; although they do not always arrest the inflammation, and the wounds are sometimes followed by a vitiated ulceration extremely difficult to arrest. In the St. Louis epidemic, Dr. Reyburn found local bleeding decidedly and rapidly beneficial. In the St. Clair epidemic, Dr. Carroll found the same advantage in cupping, especially when the brain was deeply implicated.

2. Emetics are in common use throughout the Valley; and the reports are generally in their favor. They may be administered when venesection is not admissible; but when the fulness and force of the pulse are great, the latter is a good preparative. The influence of vomiting on the circulation, which it reduces and equalizes, on the skin, the actions in which it tends to change, but especially on the throat, in arresting the inflammation, altering the secretions, and detaching adherent mucus and lymph, indicate

sufficiently the modes in which it may prove beneficial. If laryngitis or bronchitis should be present, vomiting may be still more demanded. It may be induced by a free and rapid administration of the medicine; or produced as an occasional or incidental effect, while the medicine is given in nauseating doses. The latter method is preferable in cases of a highly inflammatory character: the former, when early exhaustion is anticipated. The emetics most in use are ipecacuanha and tartarized antimony. The first, at all times genial to the systems of children, is in most general use; and will perhaps always maintain the relative rank it has long held. The second, more directly sedative, is well fitted to cases of high phlogistic action, in which it may be advantageously combined with nitrate of potash, and given in broken doses. After free vomiting, it is highly beneficial to administer a dose of paregoric, laudanum, or the sulphate of morphia.

3. Purging is resorted to by most of our physicians, and as a means of reducing the morbid excitement of the surface, it deserves great confidence. The inevitable effect of purging is introversion of the currents of the circulation, and consequent abatement of the inflammatory congestion and inordinate heat of the skin; effects obtainable by venesection at the expense of the fibrin of the blood, and at the risk of developing constitutional irritation, while by purging they are procured by *natural* revulsion. Again, when inflammation of the membranes of the brain has supervened, profuse purging may make powerful and salutary diversion from the head, affording a relief which no other therapeutic agency could impart. To continue purging after the heat and bright redness of the skin are reduced, is always injurious, for the morbid action set up in that tissue is a legitimate portion of the disease, and should be allowed to run its course. If, when the skin has lost its inordinate heat and high color, there should be cerebral symptoms which call for revulsion, local bleeding and counter irritation should be substituted for further alvine evacuation. At night, after such evacuation, except when the brain is manifestly the seat of inflammatory hyperæmia, the administration of a gentle opiate will be highly beneficial. Of cathartics, the best is calomel, which may be quickened in its action by minute doses of tartarised antimony, or by jalap, or an infusion of senna and manna, to which, in the case of children, it will always be judicious to add spigelia as a vermifuge.

4. The superior efficacy of calomel must not be referred to its specific action on the biliary apparatus, seldom particularly involved in this fever, but to its power over serous inflammation, to which, in scarlatina, there is so great a tendency. Hence repeated doses of that medicine should not be regarded as altogether an empirical practice, although even a salivation cannot arrest the progress of the fever; and in children it should never be so given as to run the risk of producing that sinister effect.

5. I have already spoken of the value of water in simple scarlatina, where its limited application only is required. In the grade or variety of the disease now under consideration, it becomes a remedy of far greater impor-

tance. Indeed, of all the measures proposed in acute cases of scarlatina anginosa, it is, perhaps, the most valuable. Its use is general throughout our Valley, and the reports are nearly all in its favor. I have long been accustomed to prescribe it, and, on the whole, had much reason to be satisfied with its effects. When the heat of the skin is excessive, accompanied as it always is with great restlessness, extensive washing, or the actual affusion of buckets of water just from the fountain (and it should never be colder), diminishes the temperature, appeases the restlessness, reduces the inordinate frequency of the pulse, and for a time greatly improves the condition of the patient. When the cutaneous excitement revives, the affusions may be repeated; but if the reaction should be slow, and a purple or livid hue should replace the scarlet tint existing when the application was made, it must not be repeated. Of its topical applications those to the throat and head are the chief. Pellets of ice may be held in the mouth, or slowly swallowed; and soft towels, dipped in ice-water, may be wrapped round the neck, or gently pressed against the throat, and continued *after* the time when it would be proper to employ general affusions. When delirium, or coma, or severe headache, indicates cerebral lesion, cold applications to the scalp will be among the most efficacious means of relief. To this end, no reliance is to be placed on a wet, folded rag, laid on the hair of the crown of the head (the people's favorite mode), but the entire scalp should be freely sponged every few minutes, and evaporation promoted by fanning or a current of external air. In the condition of the brain and its membranes demanding these applications, the feet are apt to be too cool, in which case, immersing them in hot water will harmonize with the refrigerating applications to the head. When ophthalmia supervenes, water is one of the best resources of the profession. It may be poured on the eyes, and injected within the lids, and will in general be found most acceptable to the patient, if it be not very cold. Its power over otitis is less, from the deep and insulated situation of the parts which are the seat of that affection.

6. I cannot regard blisters as of great value in anginose scarlatina. If the rash should not appear at the proper time, and a stimulating application to the skin be demanded, they are inferior to sinapisms, which act more promptly, pungently, and transiently. As a means of moderating the fever, they are worse than useless. It is, in fact, for the relief of local affections only that they should be applied, and then topical bleeding, followed by cold applications, is to be preferred. When the affection of the brain is obstinate, and the power of bearing leeching or cupping seems to be exhausted, a blister to the nucha may do good; and applied to the same part, it may moderate the affection of the throat.

7. Applications to the fauces are never neglected in this disease, but often made so inefficiently as not to extend below the uvula and front curtains of the palate, to which the back part of the tongue presses itself when we attempt to apply a wash. To reach the tonsils and pharynx, the

child's head must be firmly held by an assistant, and the tongue depressed with a finger, or a non-metallic spatula. To effect this, the pressure must be firmly sustained for many seconds, until the patient begins to gag, when the upper extremity of the pharynx and tonsils will be completely exposed, and a soft large mop, saturated with the gargle, may be boldly thrust against the back part of the pharyngeal walls, or the solution may be injected by a syringe, the stream being rapidly carried over every part. The coughing, hawking, or retching that succeeds detaches from the mucous membrane whatever deposits of mucus or lymph may be upon it, or sloughs which may have been previously loosened, while the impress of the gargle on the inflamed or ulcerated membrane or tonsils proves beneficial. Another, but inferior mode of obtaining the same result, is by forming the medicine into a linctus, or, combining it with white sugar, into a powder, to be laid on the tongue, and suffered, as it were, to glide or trickle into the fauces. In common cases of anginose scarlatina, attended with an inflammatory diathesis, the best gargles are the chlorides of soda or lime,* and the best powder is a compound of nitrate of potash or borax (biborate of soda), powdered gum Arabic, and refined sugar, intimately mixed by trituration.

The malignant variety of scarlatina admits but few of the antiphlogistic measures which have been enumerated. Venesection and active purging are forbidden, and the general application of cold water is inadmissible. Emetics, however, are not to be rejected; but, on the contrary, are as valuable in this variety as in the more inflammatory. But the adynamic state of the system requires that the most stimulating ones should be employed. Of the whole, mustard in warm water, the wine of ipecacuanha, an infusion of lobelia inflata, or an infusion of eupatorium perfoliatum with powdered ipecac., is the best. To promote gentle alvine evacuation, pills consisting of one part of capsicum, two of blue mass, and three of rhubarb, may be occasionally administered, or, in place of them, an infusion of senna, manna, and orange peel, or the tincture of rhubarb with gentian. A stimulant or tonic carried through the whole length of the intestinal canal, in connection with a laxative, will prevent the exhausting influence of the evacuation. Although venesection is inadmissible, leeching and cupping may be employed, when the cerebral or anginose symptoms are urgent; and while the general application of cold water is improper, it may be topically applied to the throat, cervical ganglia, and scalp, with advantage. Blisters must be used with caution from the prevailing tendency to gangrene.

By common consent, the active and only efficient treatment in this form of scarlatina is the corroborant—constitutional and local. When the rash does not appear, and the skin is dark or livid, and below the proper temperature, a stimulating bath with frictions may do great good; and if an

* [Proper proportions are from ʒj. to ʒij of Labarraque's solution to ʒj. of water, sweetened with honey.]

emetic should be so administered as to operate at the same time, so much the better.

Of internal tonics, there can be no doubt that the bark is decidedly preferable to any other; and its administration may be commenced soon after the patient has ceased to vomit. It may be given in drachm doses every two or three hours in wine; or an ounce of the officinal decoction acidulated with elixir vitriol may be exhibited at the same periods; or an acidulous solution of quinine, containing one, two or four grains of the sulphate, may be substituted for both. As a powerful and permanent tonic, the bark is more to be relied upon, however, than the quinine. The doses proposed are for adults, and must of course be reduced for children.

Bitter tonics and stimulants of other kinds have been proposed; but why should we diversify our prescriptions, when we already have the best? If the powers of the system fail under the use of the cinchona, the case is hopeless. It is proper, however, to employ adjuvants, such as wine of a good quality, porter, old whiskey, or *genuine* French brandy, opium in quantities sufficient to produce and maintain a slight degree of narcotism, and carbonate of ammonia dissolved in a sweetened infusion of capsicum. To these may be added broths, rich in gelatine, and rendered stimulating with salt and black pepper, or amylaceous jellies with wine, nutmeg, and other condiments; or strong coffee and boiled milk in equal proportions. The difficulty of deglutition is often so great as to make it proper to employ the most concentrated aliment.

Applications to the throat appear to be of greater importance in malignant than anginose scarlatina; and should always be of a more stimulating quality. I have used with advantage a formula which had been employed in the West Indies for more than half a century, and which Dr. Warfield in the Kentucky epidemic of 1827 found beneficial.* It consists of two tablespoonfuls of cayenne, and one of common salt, infused in half a pint of boiling water, and the same quantity of hot vinegar. After standing hot an hour to be strained. With this the throat may be mopped, or the medicine may be swallowed at short intervals in tea or tablespoonful doses, according to the age of the patient. In the latter mode of exhibition its effects are both local and constitutional. In the epidemic just mentioned Dr. Warfield also used a gargle of bark, borax, and tincture of myrrh in water with great advantage. The ingredients of this formula are in fact those which are in general use. The tincture of myrrh and honey in equal proportions applied with a mop are good. Water rendered sour with muriatic or oxy-muriatic acid, and sweetened with honey is a valuable gargle. But no application to the throat is superior to a solution of chloride of lime or soda, made stronger than that directed in scarlatina anginosa. From analogy the tincture of iodine might be expected to do good. The nitrate of silver and sulphate of copper in solution are deserving of confidence;

* West. Med. and Phys. Jour. vol. i.

but the former from its ready decomposition, by the muriates of the mucus of the throat, should be made much stronger than we commonly employ it. When sloughing or gangrenous ulcers form, they should be touched with these escharotics in a solid form, or with a mop saturated with a caustic solution of subcarbonate of potash.

Externally around the throat, Dr. Warfield applied an embrocation of proof spirit saturated with common salt. It produced redness, and in a day or two a pustular eruption, followed by the best effects.

Of the anasarca consequent on scarlatina, but little has been said by the Western physicians who have written on the disease, or by any others with whom I have conversed, from which, in connection with my own experience, I infer that dropsy does not often follow on the scarlatina. I have seldom seen it in any other part of the body than the face; and never knew it to be fatal. As a general fact the treatment of this affection should be that of inflammatory dropsy. The force of the circulation is too great, or the exhalent function of the cellular or the serous membranes is over active from a condition of the capillary circulation not different from that of inflammation. It rarely happens, however, that venesection is required, and in general hydragogue purges and refrigerant diuretics will effect a speedy cure. Of the former, ten grains of calomel or blue mass, and the same quantity of squill, mixed and divided into four pills, one to be given every two or three hours, every other day; or the sixth of a grain of elaterium, and ten grains of supertartrate of potash mixed, at similar periods, will prove equal to any other formula. Of the latter, a grain of squill and five of nitrate of potash in a powder, every two or three hours; or an ounce of the infusion of digitalis, with a drachm of spirit. nitr. dulc., three or four times a day; or a simple solution of crem. tart., to which if the patient be debilitated, gin and sugar may be added, will be sufficient; but in most cases, the dropsy will yield to time, flannel, and frictions, to restore the functions of the skin, fresh air and gentle exercise, without a resort to any kind of active treatment.

SECTION II.

SCARLATINA AND MEASLES, COMBINED.

It should not astonish us, that for a long time measles and scarlatina were confounded, under the former appellation; for in addition to the resemblance in their symptoms, they are occasionally epidemic at the same time and place. As far back as the years 1811, '12, and '13, I saw many evidences of this combination in Cincinnati. In the first of these years the scarlatinous influence predominated, in the last the morbillous. Thus we had scarlatinas which were accompanied with catarrhal symptoms superadded, and in some cases almost superseding the anginose symptoms, the

rash not displaying exactly the characteristics of either disease, while the majority of cases were well marked as scarlatina, and genuine measles did not appear. Gradually the latter epidemic gained the ascendency, and I find in my notes for the year 1813 memoranda of measles, in which the anginose symptoms indicated the presence of the scarlatinous poison in a reduced degree. I have elsewhere mentioned a case, in a subsequent year, which presented scarlatina, in the convalescence from measles, indicating the presence in the system of both infections at the same time, but producing their specific effects in succession and not in combination.

Dr. Long, and Dr. Shirley, of Jacksonville, Illinois, have seen the two diseases prevalent at the same time at that place, when cases occurred in which the symptoms were blended. Angina supervened on catarrh, and the crescent-shaped spots of rash assumed a scarlet hue, with less elevation than is common in measles. Many persons who had previously experienced measles, went through attacks of this kind.

At Canton, Ohio, Dr. Estep has seen the two fevers blended in a number of cases. The efflorescence was decidedly morbillous, but a sore throat replaced the coryza, and was followed by suppuration of the cervical ganglia, pains in the limbs, and anasarcous infiltrations. In the same family, at the same time, he saw one patient with well-characterized measles, another with scarlatina equally distinct, and another with the compound affection. He has also seen one disease finish its course, and the other set in immediately afterwards, before there had been time either to receive infection, or for the period of incubation.

In 1844, while travelling in Louisiana, I saw well-defined cases of scarlatina, when the prevailing disease was measles. In the same year, Dr. McKelvey, of St. Francisville, in that state, when both diseases were epidemic, saw a case in which the rash, for two days, was that of scarlatina; it disappeared and was immediately succeeded by that of measles, the eruptive fever seeming to have been common to the two maladies. In the same year, Dr. Fearn and Dr. Levert, of Mobile, saw measles and scarlatina so mixed up, that many cases could not be referred to either head; while distinct cases of both were occurring. In one instance, Dr. Fearn saw a well-marked scarlatinous efflorescence, in three days after the morbillous had disappeared; I did not record whether it was preceded by an eruptive fever; but the infection which produced it had manifestly been received into the system while that of the measles was still in action, or before its effects were developed. Finally, Dr. Ames, of Montgomery, Alabama, has given me an account, which I published in the Western Journal,* of the commingling of these fevers in the spring of 1844. The scarlatina preceded the measles. The first case in his practice, occurred in the last week of January, and was attended with severe bronchial symptoms. The fever spread slowly till the end of April, when it suddenly ceased. The measles

*Louisville, January, 1847.

began in the latter part of March, was most prevalent in April, and declined towards the end of May. Before and after the morbillous efflorescence began to show itself, the scarlatinous eruption was often accompanied with catarrhal symptoms; and on the other hand, the anginose affection of scarlatina was quite as often associated with a morbillous exanthem, after that form of efflorescence became predominant. It was, indeed, difficult to decide by the symptoms which preceded the eruption, to which head a case should be referred, and Dr. Ames had occasion, more than once, to change the name which he had entered on his note book. The following cases will afford an authentic illustration of this combination.

Case.—H. W., five years old, was attacked, on the 13th of April, with the usual symptoms of scarlet fever, and cough. On the third day, the eruption was very distinct, and had the characteristics of this disease. On the fourth day, in the morning, these characteristics had disappeared, and those of measles had taken their place; at the same time his face had become tumid, and his eyes red, suffused, and painful in the usual light. The eruption had now the distinctive signs of measles—in its appearance on the fourth day—in being accompanied by catarrhal symptoms—in occurring in small patches, circular or crescent-shaped, elevated and dark, with intervening portions of skin not affected. On the fifth day, the symptoms of measles were mitigated or absent; the rash, though faded, had resumed the appearances of scarlet fever, except on a small part of the arms, near the wrists, and on the knees, where it had a vivid color, and retained the appearance of measles. On the sixth day, no trace of measles could be discerned, except the cough, which was greatly aggravated. The ulcers on the tonsils had become deeper, dark, and offensive; diarrhœa had supervened; the abdomen had become tumid and tender, and the tongue dry and fissured. He died on the seventh day, apparently from enteritis.

Case.—L. W., sister of H. W., aged ten years, was attacked on the 23d of April. The symptoms were those common to scarlatina, except an almost continued sweating, which, at that time, was a common symptom of measles, and that the fever was a quotidian intermittent, distinct and regular, and accompanied by a slight cough. The eruption came out on the third day, and occupied more surface than was common. On the fifth day, a catarrh, as decided as in any case in measles, appeared, with an increase of cough. At the same time, there was such a marked change in the appearance of the eruption, as to be noticed with great alarm by her mother, who asked me, as soon as I entered the room, if the disease was changing to measles. Her attention was confined to the eruption, but on examining it carefully, I could see no change, except in its color; it was darker, and had more of the raspberry tint of measles. On the seventh day, the catarrh continuing, the eruption had disappeared entirely from the face and neck, and was faded everywhere else. On the eighth day of the disease, and fourth of the catarrh, the eruption of measles showed itself very plainly

on the face, neck, shoulders, and upper part of the chest. On the ninth day it was fully developed, without being extended beyond the parts which it occupied the day before. I did not observe any change in the scarlet rash; it did not recede, but remained in the same state as on the seventh day, until the rash of measles began to fade, and then followed the course of the latter, so that desquamation did not begin before the thirteenth day. After the measly rash came out, the fever became continued, without any abatement of the perspiration. The whole course of the complaint was mild, and convalescence went on favorably.

Dr. Ames saw pertussis at the same time with the other epidemics, and several patients were attacked with one of those exanthems while affected with the hooping-cough: other physicians have witnessed the same combination. He also observed, that the eruptive fever of measles and scarlatina in nearly all his patients, was remittent or intermittent, but became more continued when the inflammation of the mucous membranes was severe. This modification can be understood, by referring to the fact, that Montgomery and its neighborhood are infected with autumnal fever,* and that the eruptive epidemics occurred at the season when virulent intermittents prevail. Here there was the concurrence of the specific causes of three forms of fever—the periodical, morbillous, and scarlatinal; an alliance which instructs us that pathology, diagnosis, and therapeutics should be studied in connection with etiology.

Let us for a moment generalize these facts.

1. As they run through a period of thirty years, and a space of more than ten degrees of latitude, they teach us, that the combination of measles and scarlatina is far from being an uncommon event in our Valley.

2. It appears, that the two diseases are often epidemic at the same time and place, each preserving, in the majority of cases, its distinctive characteristics.

3. Sometimes one influence is much weaker than the other, and is only able to render itself perceptible, which it may do in a number of cases.

4. Now and then cases occur, in which the strength of the respective remote causes is so nearly equal, that the diagnostic symptoms of the two maladies are present in nearly the same proportions.

5. Occasionally one efflorescence immediately succeeds that of the other, showing the incubation of the second to have been going on during the more advanced stages of the first.

6. It often happens, that while but one is epidemic, well-marked sporadic cases of the other will occur. I have myself witnessed this both in Ohio and Louisiana, and others have testified to the same thing.

7. Two etiological views may be taken of this union of measles and scarlet fever; first, that those diseases are mere varieties of one species, and therefore disposed to unite in the formation of a new variety; second, that

* See vol. i. p. 187.

they are distinct but closely allied species, members of the same genus, and, therefore, fitted to concur in the production of a mongrel, which, like other specimens of hybridity, is incapable of perpetuating its kind. This is doubtless the correct view; and hence we have no morbillo-scarlatinal contagion. But in this coalition, does either disease preserve its power of propagation, or do both, or the one only which predominates in the morbid compounds? These are questions which I am not able to answer. Nor can I say whether the individual in whose system the two poisons have been active at the same time, is afterwards in a state of immunity from both or either.

CHAPTER VII.

ROSE-RASH—ROSEOLA: ALSO LICHEN AND STROPHULUS.

EVERY physician is aware of the diagnostic difficulties presented by the eruptive diseases, which in the books of dermoid nosology, are referred to the heads of Roseola, Lichen, and Strophulus, under which they are divided into many species or varieties; by Dr. Willan into no less than eighteen. As they are all more or less papulous, as in their acute forms the efflorescence is preceded by feverishness, and tends in most of them to produce a branny desquamation, it is easy to perceive that the labor of studying their diagnostic relations is not small. Moreover, most of them occur but seldom; very few of them require medical aid, and all or nearly the whole are free from danger. Opportunities and motives then for studying them do not in fact exist, and the most diligent inquiry among our physicians could not bring out much that would be worthy of publication.

1. I have seen a few cases which answered to Dr. Willan's *Roseola æstiva*. They might have passed for mild cases of scarlatina. Indeed, it cannot be doubted that these affections have been often confounded, for in Roseola there is often a slight affection of the throat, quite as much as attends on some cases of real strophulus simplex. The scarlet hue of one, and the roseate tint of the other will aid us in a discriminating diagnosis; but the conclusive point of distinction is the recurring tendency of Roseola.

2. *Lichen tropicus* or prickly-heat, occurs every where throughout our Valley; but here I might remark that the latter designation, like hives, is applied by the people, and most of our physicians, who follow them, to almost every kind of papulous eruption occurring in hot weather. But a few days since, the weather being hot, I saw a little girl, not three years old, with a papulous eruption on one side of her neck, which, without any previous indisposition, had begun the night before, and was rapidly spreading. The next day it had descended upon her chest, and presented an aspect which excited anxiety in her parents. On the second day after it began,

her brother, about two years older than herself, experienced an attack of the same kind. In both cases there was no previous fever, and at the end of three or four days, the efflorescence disappeared with a furfuraceous desquamation. This was called prickly-heat by the mother, and was one of the great variety of eruptions which have received that name. A nosologist would, I presume, refer it to Dr. Willan's genus lichen, though it might puzzle him to bring it under any one of the Doctor's specific descriptions. The same remark would be applicable to many other cases to which the attention of the physician is casually directed, one of which I may give as an illustration of the whole.

A maiden lady, thirty years of age, who suffered more or less from dyspepsia, with occasional protracted fits of hypochondriasis, but at the time in her best gastric health, with unusual buoyancy of spirits, on the 18th of May, 1841, began to feel a slight itching and burning on the left side of her neck, just above the clavicle, with redness of the part. On the next day, the spot had extended down upon the chest, and the sense of heat and smarting had greatly increased, but still she had no fever. Cloths dipped in tepid water were applied to the part, and on the night of the 19th she took ten grains of calomel. On the 20th it was still spreading, and although papulæ were discoverable, bore much of the aspect of erysipelas, and was accompanied with a feeling of intense heat, not at all mitigated by the operation of the calomel,—still she had no fever. Dusting it with starch afforded no relief. A solution of two and a half grains of corrosive sublimate, in an ounce of distilled water, was applied, the effect of which, to use her own expression, was as if scalding water had been poured upon the part, though it was kept on but a few minutes. Cream was then applied, but afforded no relief; and a slippery-elm poultice was compared in its effects to the sublimate. Under these disappointments, she took an ounce of paregoric. On the following night, 21st, she took a second dose of calomel combined with Dover's powder, and the next day, magnesia and lemonade, as a cathartic. To the inflamed parts mild mercurial ointment was applied, and afforded a partial relief. On the night of the 22d she took a syrup of sulph. of morphine, with wine of ipecac. On the 23d the ointment was continued, and at night she repeated the calomel and Dover's powder. On the afternoon of the 24th the itching revived, and became quite intolerable, when she laid aside the ointment and resumed the tepid water; at the same time the sense of burning occurred in spots on various parts of her body, which were seen to present a papulous appearance. The itching was urgent, and rubbing or scratching increased it, and extended the redness, at the same time she experienced a number of slight chills. As she had been copiously purged, she was now ordered to take the sulphate of quinine and Dover's powder, and a solution of acetate of lead was applied to the skin, but neither afforded any relief. Her sufferings were now very great, and her morbid irritability extreme. On the morning of the 26th, she took an

active emetic. No bile was thrown up, but she was manifestly better, and from that time mended so rapidly, that on the 29th she was able to go out. On the decline of the inflammation the skin was rough. Throughout the whole of this tedious attack there was scarcely an hour in which fever could be detected. In every stage of it, the evidences of constitutional irritation were decided. It is probable that if she had taken an emetic on the first day of the attack it would have been at once arrested.

3. Of *strophulus*, I may say that the variety denominated *intertinctus*, or red gum, is common among our infants, and as benign, or at least as free from danger as it is known to be elsewhere.

CHAPTER VIII.

NETTLE-RASH—URTICARIA.

Prevalence.—Among the minor exanthems of our midland Valley, urticaria is certainly the chief, and in the natural order I have adopted, ranges alongside of erysipelas, with which its etiological and diagnostic relations are, perhaps, greater than with any other. I have never seen a fatal case of this malady; but its distressing character, and its obstinate recurrence, in certain constitutions, render it an object of interest both to the profession and the people. It never appears as an epidemic; but is by no means the rarest of our sporadic diseases, and is met with in every part of the Valley. Occurring in most cases as an acute disease, it now and then assumes a chronic form, not, it is true, existing all the time, but recurring under the influence of the slightest exciting cause.

Diagnosis.—Urticaria, as far as the skin is concerned, presents an outbreak of wheals, weals, whales, or whelks, that is, of spots resembling those produced by the sharp stroke of a whip or switch. These words, the last of which is preferred in this country, are supposed by Webster to be derived from a Welsh root, signifying a twig or small limb of a tree. As all persons have seen elevations produced by such an instrument, a reference to them is more instructive than a page of descriptive diagnosis. The names, both Latin and English, by which this assemblage of whelks is known, are equally instructive, as they refer to the spots produced by the sting of nettles.

The people have for this affection still another name—*hives;* but as they apply it without discrimination to a variety of eruptions, it cannot be received as designating especially that now under consideration.

When the whelks in urticaria are about to rise in any part, a slight and warm itching is felt, which leads the individual to rub or scratch it, when they instantly appear, not at all, however, to his relief; for the heat,

tingling, and formication, are increased, and the desire to scratch becomes urgent. Its indulgence, so far from affording relief, augments both the sensations and the number and dimensions of the whelks, which, at length, become confluent, and give to the part a tumefaction and redness, which a superficial observer might mistake for erysipelas, especially if seated on the face. Unlike erysipelas, however, urticaria appears on various parts of the body at the same time, and oftener in circular, oval, or oblong isolated spots than confluent patches. The height to which they rise is such as to suggest a great influx of blood, for nothing else could suddenly so distend a portion of the skin. Their summits, or central parts, are often white, while their declivities and margins are of a rose, or deep red color. Although they appear independently of friction, it is remarkable that during the continuance of an acute urticarious diathesis, scratching any part of the skin will bring them out. In duration they are essentially evanescent, occasionally disappearing in a single hour or less, then reappearing in some other part, and continuing the attack for a day or two. In nearly all the cases of acute urticaria which I have met with, the efflorescence was preceded by some degree of constitutional disorder. Sometimes a mild and short paroxysm of fever, but more commonly nausea, vomiting, and diarrhœa. On the sudden retrocession of the whelks, a feeling of general weakness, epigastric sinking, nausea, with apparent tendency to fainting, is experienced for a short time, when it passes away with or without a recurrence of the rash. Although an attack may be concluded in a few hours, it may be prolonged through several days or a fortnight, during which, however, the chief suffering of the patient will be the pruritus or itching, which is sometimes annoying in parts where no whelks appear even under severe scratching. I have never seen papulæ, vesicles, pustules, or desquamation in this eruption. Authors speak of women and children as peculiarly liable to urticaria; but it has happened to me to see it chiefly in men in the earlier years of middle life. As to seasons, I have met with it oftener in summer than any other.

Remote and Pathological Causes.—Most acute and transient attacks of urticaria may be traced up to some internal irritation, generally in the digestive organs, sometimes in the uterine, never as far I have seen in the lungs or brain. In many cases the internal or radical affection is an irritation of the gastro-intestinal mucous membrane, produced by some article of diet or drink, which from its indigestible character, or the bad health or idiosyncrasy of the patient, proves an irritant. On the shores of the Gulf of Mexico, or in other maritime districts, crabs, lobsters, and other shell-fish occasionally produce it. In the interior, indigestible articles taken to excess, especially in hot weather, occasion it. One of the most sudden and violent cases which I have ever seen, occurred in a man, who after a long ride, in a hot day, ate a hearty supper of cold "pot-pie," a well-known boiled compound of recently killed chicken, unleavened dough, butter, and black pepper. I

have seen many cases, however, which could not be traced up to any irregularity of diet, though generally occurring in dyspeptics, or those who drank to excess; indeed a debauch, in the earlier stages of a life of intemperance, is often followed by urticaria. Now and then it occurs as a contingent or anomalous symptom in our autumnal fevers. At Fort Gratiot, Dr. Pitcher, when in the army, saw many fatal cases in which urticaria appeared on skins which had assumed a golden yellow color. In the year 1809, I saw it occur with violence in a patient laboring under jaundice. A copious bleeding removed it, the jaundice still continuing. These etiological specimens will be sufficient to suggest both the

Prophylaxis and Treatment.—Those who through idiosyncrasy experience the disease from any particular article of diet or drink, will of course avoid such. Dyspeptics must eschew heavy meals of indigestible food, and employ the means proper for the removal of their habitual disease. Such as labor under chronic affections of the liver or uterine system must do the same. Excessive clothing in summer, and deficient in winter must be avoided; and alcoholic drinks must be superseded by simple water.

When the attack occurs, the first question should be as to the ingestion of any unusual or excessive quantity of food or drink, or the use of any article of medicine, which might have excited it, of which the stomach should at once be freed by an emetico-cathartic. If fever be present, a copious bleeding should precede the vomit; or if the disease should not cease on the evacuation of the stomach and bowels, the lancet then, if not before, is called for. After these evacuations, opium with or without a diffusible antispasmodic, such as ammonia or ether, should be administered to allay the nervous irritation, and prevent the patient from rubbing or scratching his skin. If the patient be habitually dyspeptic an antacid should be administered—if a child in the period of dentition, the gums should be cut—if after that time, a vermifuge ought to be administered. A tepid shower-bath or affusion will do good, and its effects be augmented by dusting the surface of the body with starch as soon as it is wiped dry. From the beginning, a copious use of diluents, with a little nitrate or bicarbonate of potash, will be proper. When upon a sudden recession of the wheals, the sense of epigastric sinking is great, a sinapism should be applied over the part.

The following cases will serve to illustrate both the symptoms and treatment of this disease.

Case requiring Venesection.—In the month of August, 1813, a robust gentleman, about 32 years of age, not very regular in his habits, arrived in Cincinnati from the western part of Illinois. Although able to travel on horseback, he consulted me for some fastidiousness of appetite, a slight pain in the region of the liver, and occasional flushes of fever. He took an emetic and two cathartics, discharged considerable bile, was relieved of the hypochondriac pain and felt better. Coming from a malarious region, I now

directed tincture of cinchona, of which he had only taken a single dose, when an eruption of large wheIks occurred over most of his body. They presented a variety of forms, but were chiefly oblong or oval, whitish in the centre, and red in the border. The itching in them was intolerable, and extended, also, over the intervening skin, which on being scratched was immediately covered with the eruption. The face suffered most, exhibiting a tumefaction and redness quite erysipelatous. Even the palms of the hands, and the soles of the feet, quite back to the heels, did not escape. Considerable fever, accompanied with a white tongue, and a pain behind the ensiform cartilage speedily supervened. Saline cathartics followed by small doses of Dover's powder, for twenty-four hours, procured but little relief. I then bled him twice in one day, to the quantity, in the whole, of twenty ounces, and dusted his face with starch, when he immediately recovered. The blood was not sizy. He had suffered attacks of the same disease before, but they were less violent.

Case not requiring Venesection.—A young woman of sanguine temperament and uncommonly sound constitution, without any known cause, felt slightly and undefinably indisposed in the forenoon, during which she descended into a cellar, when a slight chill came on. In a few minutes she felt an itching sensation behind her ears, and along the lower margin of the scalp between them. On scratching the parts wheals instantly appeared, and in a brief period covered her body, being most confluent on the face. She experienced at the same time a sense of suffocation, as though there was obstruction in the larynx. Very soon she passed into a state of insensibility to surrounding objects, with a loss of consciousness, which continued for several hours, and was so perfect that she was afterwards unable to recollect anything which passed during that period. I did not attend her, but suppose from the account given me, that it was a kind of hysterical reverie. She was at length relieved by an emetic.

Within a few years afterwards, when a married woman, she experienced two other attacks.

In the month of June, 1841, ten or twelve years after the first attack, being at the time a widow and enjoying perfect health, she experienced a fourth. On the day of its occurrence, she breakfasted and dined on her usual diet. In the course of the forenoon she had two alvine evacuations, and in the afternoon felt a gloom for which she could assign no cause, either physical or moral. In the evening she began to experience a burning and prickling sensation in the skin of her neck, spreading rapidly over her whole body, which was immediately covered with wheals. When I reached the house at eight o'clock, she had vomited a little, her face was red, her pulse one hundred and sixteen in a minute, her tongue pale but not furred, her mind agitated; she thought herself in great danger, shed tears, and complained of choking—in short had a fit of hysteria in connection with an outbreak of urticaria. I immediately administered ʒiv of antimonial wine with ʒj of lau-

dænum, and soon afterwards another but smaller dose of the latter. She vomited a number of times, throwing up but little however; a part of the vomited matter tasted sour, which led me to administer a solution of carbonate of potash. At ten o'clock she was much better. Her pulse had fallen twenty-four beats in a minute, that is to ninety-two; the rash had receded, and the agitation of her nervous system had nearly ceased. She then took a dose of calomel, and I left her. The next morning I found that she had not rested well, but the wheals were gone. A dose of magnesia with lemonade was now ordered, and she was soon quite well.

This case, both in its phenomena and treatment, show that while many cases of urticaria demand the lancet, there are others which are attended with constitutional irritation.

Chronic Cases.—1. A gentleman who had from early manhood labored under dyspepsia, unaccompanied with gastritis, when about thirty-two years of age was very much relieved by a liberal diet and the daily use at dinner of whiskey and water. Some time after this salutary change, he had an attack of acute urticaria, which began with itching and an outbreak of wheals on the back of the neck and behind the ears. For some time afterwards he had an occasional return of the same kind. When in his fortieth year he suffered an alarming attack of cerebral congestion, for which he lost nearly one hundred ounces of blood, none of which gave signs of inflammation. This was in the summer. As the cool weather of the ensuing autumn came on, his extremities began to be affected with urticaria, which became habitual until the warm weather of the following year. He was at no time entirely free from it, but cold was the great exciting cause. When exposed during the winter, the itching of the skin, especially of his feet, became almost insupportable, and was invariably relieved by heating them at the fire. The coldness of winter sheets so affected him as to compel him to sleep in flannel drawers. Through the whole of these months of annoyance his health was good, and his liver acted with even more constancy than usual. In the following summer he suffered but little, but as the cool weather returned, the disease came with it, though somewhat mitigated in violence. In the succeeding winter it annoyed him still less, but although twenty years have elapsed, his lower extremities are still more or less affected by the cold weather, and especially by cold linen sheets.

CHAPTER IX.

ERYSIPELAS—INTRODUCTORY.

If any one is incredulous as to the occurrence of sporadic cases of yellow fever, measles, or scarlatina, the history of erysipelas reasoned upon analo-

gically, is well fitted to remove his doubts. Whatever may be the uncertainty as to the former, there is none whatever in reference to the latter. All the world is familiar with its sporadic form, and within the last few years it has prevailed, to so great an extent in many localities, from the Lakes to the Gulf of Mexico, as to establish its epidemic character, if indeed its occasional epidemic prevalence in other countries had not already shown the same thing. Till within the last few years most of our physicians have, however, known it only as a sporadic disease. In proceeding to treat of it, I shall first consider it under the two heads suggested by these remarks.

SECTION I.

SPORADIC ERYSIPELAS.

Symptoms.—Sporadic erysipelas is generally limited to the skin and subcutaneous cellular tissue, extending now and then to the serous membranes, especially the cerebral. I do not recollect to have seen a case in which it invaded the mucous membranes. Common as it is in the face, it generally advances as far as the mucous membranes of the mouth and nostrils, and there abruptly stops.

Erysipelatous inflammation, of a common kind, is easily distinguished from all the eruptions we have been studying in this, that it consists in a uniform inflammatory congestion of the skin, commencing at a point and spreading in one or all directions. The affected part is slightly raised, and generally presents a defined margin. Its color varies from a bright to a dark red, according to the vigor of circulation, and the age of the patient. In most cases the vessels may be relieved of their hyperæmia by pressure, but the redness returns on removing the finger. Although the pain is seldom acute, there is an uncomfortable sense of heat and smarting, the influence of which on the nervous system renders the patient irritable and restless. When intense, vesicles, and even large bullæ, frequently form here and there upon the inflamed surface, and, in bad constitutions, may assume a gangrenous character. They sometimes break and form crusts. The trunk of the body is less liable to erysipelas than the extremities, including the head, which, of the whole, is oftenest attacked. Wherever it begins, it often takes the course of the distal end of the part, presenting a kind of analogy with deep-seated cellular or phlegmonous inflammation, which aims, so to speak, for the surface. The nearer, therefore, to the point to which erysipelas tends, the better is the prognosis. Thus, when it commences on the forearm, the case is better than when it begins about the shoulder; when it begins on the cheek, better than upon the neck or behind the ears. In both cases it is apt to take the direction of the nose, ceasing at the tip; but sometimes it may pass off at the margin of the ears. Now

and then it commences on the back part of the head or neck, and advances forward on both sides to the mouth and nose. In cases which tend to a favorable termination the inflammation ceases behind while it is still advancing forward with unabated activity. Its cessation is followed by an exfoliation of the cuticle in larger flakes than those cast off in measles and scarlatina. Although erysipelas generally has but one starting point, and spreads by what Mr. Hunter calls continuous sympathy, it sometimes arises in different places at the same time, or ceasing in one appears in another. Every physician has seen mild cases of erysipelas which commenced without previous indisposition; but in general there is fever, with derangement of the digestive functions, for one or a few days, which may be compared with the eruptive fever of measles or scarlatina rather than of small-pox, seeing that it does not cease on the appearance of the cutaneous inflammation; but often becomes more intense, and, in mild cases, supervenes after the affection of the skin has spread to some extent, although none had preceded its outbreak. In vigorous constitutions this fever is always acute and inflammatory; but in those of an opposite kind, it frequently assumes an adynamic or typhous character.

An immense majority of mankind pass their lives without experiencing an attack of the disease we have described; but there are a few who are liable to it, and suffer repeated attacks. It affects both sexes and persons of all ages; being more acute and amenable to treatment in youth and manhood, most adynamic and dangerous in early infancy and old age.

Our books abound in varieties, so called, of this disease. Let us look at a few of them.

Traumatic Erysipelas.—All the world knows that wounds and injuries, which produce a solution of continuity, are sometimes followed by erysipelas. In hospitals it occurs from these causes much oftener than in private practice. The injury can only be regarded as an exciting cause. The erysipelas is only a sinister occurrence, increasing the danger from the injury, which in turn renders the erysipelas more unmanageable than idiopathic cases occurring in the same constitution. It must be granted, however, that a bad or broken down constitution is generally the predisposing cause of this attack; as out of hospitals it seldom occurs to those who were in good health when the injury was inflicted.

Infantile Erysipelas is always dangerous. In the cases which have fallen under my observation, I was not able to assign any remote cause. They had no connection with an epidemic of any kind, or with a prevailing puerperal fever. The vital forces of the young infant sink rapidly under the reactive influence of the inflamed skin, as they would under a scald, which might be denominated a factitious erysipelas suddenly induced by an external cause.

Phlegmonous Erysipelas.—The mildest cases of erysipelas may, in our vernacular phrase, be said to be only "skin deep." The swelling in such

is inconsiderable. The more violent dip into the subcutaneous cellular tissue, and a true *cellulitis* is superadded to the cutaneous erythema. This cellular inflammation presents two striking characteristics: first, it diffuses itself far and wide among and beneath the muscles, tendons, fasciæ, and aponeuroses; second, it terminates in early and extensive suppuration, under which, after great suffering, the patient may at last sink exhausted.

Œdematous Erysipelas.—Whenever erysipelas spreads over parts which abound in loose cellular tissue, as the eyelids and scrotum, for example, a copious effusion of serum tumefies and renders them œdematous. A part in this condition lacks the hardness, tension, heat, redness, and pain which are present in diffuse inflammation of the cellular tissue. In vigorous constitutions this condition is unattended with any special danger; but in the aged or infirm may be followed by the death of the part.

Causes.—Sporadic erysipelas has no specific cause. Of the state of the constitution which predisposes to the disease, it is impossible to speak very definitely. Those who are plethoric and irritable, without much firmness of fibre, as young females, are said to be liable; aged persons in whom the circulation of the extremities has become languid, are subject to it; a tardy or imperfect convalescence from continued fevers, especially the eruptive, favors its occurrence; breathing some kind of contaminated air, as that of a hospital, has the same effect; dissection wounds or other inoculations of morbid animal poisons; the pathological condition produced by habitual intemperance is, perhaps, the most frequent cause; finally, disordered states of the liver, stomach, and bowels, and other internal organs, in some instances, appear to generate it as an external sympathetic affection. We must not forget that all the pathological states here enumerated occur in multitudes without the supervention of this cutaneous inflammation; and that a large proportion of cases are developed under the immediate influence of some lesion of the skin, acting as an exciting cause, that is, raising an inflammation in that tissue, which, under a bad state of the constitution, assumes at once an erysipelatous character. Nor should we overlook the fact that in some cases which are supposed to be sympathetic, the disease may in fact commence in the skin, and become the cause of the internal disorders which are assumed to have occasioned it. Of this kind, perhaps, was the following:—

Case of Erysipelas and Diarrhœa, alternating.—In the month of August, 1840, the late lamented Dr. Rhodes, of Zanesville, Ohio, took me to see one of his patients, a corpulent lady, seventy-four years of age. About two months before she had been seized with erysipelas on the front of her abdomen and thighs. In three weeks it nearly disappeared, and a diarrhœa came on, which proved obstinate, and continued for a fortnight, when it ceased, and the erysipelas returned, and in a week was as bad as in the first attack, soon after which it began to disappear, and the diarrhœa recurred. It was during this recurrence that I saw her. The affected skin

was free from inflammation, her tongue was dry, and she manifested both coma and delirium in a slight degree. The termination was fatal.

Danger.—The dangers in this disease may be in part inferred from what has been said of the pathological conditions which predispose to it. A constitution impaired by intemperance, innutritious diet, foul air, or actual diseases, either acute or chronic, cannot hold out against the reactive influence of an extensive cutaneous inflammation, which is itself apt to become gangrenous from a failure in the vital forces. Again, the spreading character of the disease is a source of danger. As long as its diffusion is in the cutaneous tissue, the danger is less; but if it dip deep into the intermuscular system, fatal suppurations may occur; or, if it should attack the mucous membranes of the throat, a mortal œdematous laryngitis may supervene; or should it penetrate the cranium and seize on the membranes of the brain, the patient may fall a victim of arachnitis, and this, from the great frequency of the disease on the face and head, is, above all others, the mode in which this malady proves fatal.

This brief account of sporadic or occasional erysipelas seemed a necessary introduction to the study of the more important epidemic variety to which we must now apply, comprising the treatment of both forms under one head.

SECTION II.

EPIDEMIC ERYSIPELAS—CHRONOLOGY, GEOGRAPHY, AND CONTAGION.

1. *Chronology and Geography.*—As far as I know or can learn, our Interior Valley has never experienced but one epidemic visitation of erysipelas. Occurring at a late period, we might suppose that the materials for a full and instructive history could undoubtedly be found, but such is not the fact, for the accounts which have been published are few compared with the number of places attacked, and many of them are mere sketches. The *desiderata* left by them have been to some extent supplied by my notes of conversation with a number of physicians; but the whole fall short of what medical history demands.

In seeking for the commencement of the epidemic, I said that in the year 1826 it prevailed in Burlington, Vermont, on the shores of Lake Champlain; in 1832 in Ogdensburg, on the St. Lawrence, where it still existed when I visited that place in 1847; and in 1835–6, in Preble County, Ohio. These invasions, especially the first, were so long before the general prevalence, that the propriety of connecting them with it may be doubted; I shall, however, regard them as its beginning.

Considered in its totality, this epidemic was in fact a series or system of subepidemics which prevailed in limited and isolated neighborhoods. Its rise in each was generally by sporadic cases, gradually becoming more nume-

rous; and hence it is not easy to say in what season it actually commenced. Its duration was various in different places, and most of the accounts which have been given leave it uncertain at what time after the commencement it finally ceased. To make its chronology and geography more intelligible, I have thrown the whole into a tabular view; and included in it such references to the topographical part of this treatise, as will enable the reader to study the physical condition of most of the localities in which it prevailed.

LOCAL EPIDEMICS.

CHRONOLOGY.		GEOGRAPHY.		Topographical References. Vol. I.
Year.	Season or Month.	North Lat.	Locality.	Page.
1826,	Winter,	44° 40′	Burlington, Vermont,	420
1832,	Unknown,	44° 45′	Ogdensburg, New York,	415
1833,	Spring,		St. Clairsville, Ohio.*	
1836,	January,	39° 45′	Preble Co., Ohio,	297
1841,	Summer,	45° 15′	Eastern Township, Canada E.,	421–2
1841–2,	Winter,	44° 00′	Middleburg, Vermont,	"
"	"	" "	Moriah and Crown Point, New York,	"
1842,	Spring,	" "	St. Albans, Vermont,	"
"	July,	" "	St. Johnsburg, "	"
"	November,	39° 00′	Ripley Co., Indiana,	305
1842–3,	Winter,	38° 50′	St. Charles, Missouri,	142
"	"	39° 00′	Booneville, "	168
"	"	39° 30′	Miami Valley, Ohio,	297
"	"	36° 34′	New Madrid, Mo.,	132
1843,	November,	43° 00′	Wales and other townships of Erie Co., New York,†	380
1843–4,	Winter,	45° 31′	Montreal, Canada E.,	419
"	"	43° 00′	Milwaukie, Wisconsin,	340
"	"	42° to 43°	Various places Western New York,	380 to 406
"	"	41° 50′	Michigan City, Indiana,	343
"	"	40° 30′	Bloomington, Illinois,	322
"	"	38° 03′	Louisville Hospital, Kentucky,	248
"	"	35° 08′	Memphis, Tennessee,	133
"	"	33° 00′	Valley of Big Black, Mississippi,	208
"	"	32° 20′	Jackson, "	203
"	"	" "	Vicksburg and Warrenton, "	128
"	"	43° 00′	Counties of Genesee, Wyoming. and Allegheny, New York,	400
1844,	Spring,	31° 30′	Grand Gulf and Port Gibson, Mis.,	127, 207
"	"	34° 36′	Whitesbury, Alabama,	225
"	"	35° 30′	Columbia, Tennessee,	232
"	December,	43° 00′	Lima, Livingston Co., New York,	394
1845,	February,	34° 30′	Courtland, Alabama,	323
"	November,	43° 00′	Ontario Co., New York,	400
1845–6,	Winter,	40° 00′	Uniontown and Laurel Mount, Pa.,	268, 269
"	"	39° 15′	Meigs Co., Ohio.	
1847,	Spring,	42° 30′	Livingston Co., Michigan.	
1848–9,	Winter,	39° 00′	Brown Co., Ohio.	
"	"	32° 20′	Near Vicksburg, Mississippi.	
"	"	29° 57′	New Orleans, La., Char. Hos.,	97

* W. Jour. Louisville, vol. vi. p. 528.

† Dr. H. Jewett, Buffalo Med. Jour. vol. iii. pp. 262, 263

[illegible] extend this catalogue of notices, but the additions would not [illegible] of the conclusions deducible from it. To give the facts credi- [illegible] have, in every instance, cited the proper authority.* Let us now [illegible] they can be generalized, and what deductions can be logically [illegible] from them.

[illegible] are not at liberty, perhaps, to date the beginning of this great [illegible] constitution as far back as 1826, at Burlington; yet I was assured [illegible] Sherman, of Ogdensburg, in the same region, that after it began [illegible] place and its vicinity in 1832, it continued to prevail up to the time [illegible] visit in 1847. We see also that it occurred in Ohio in 1835. But [illegible] ist on these invasions, we have, in the table, ample evidence of [illegible] opment in 1841. In 1842, it was extending, and by the close of [illegible] had spread more widely still, so that the end of that year, and the [illegible] ng of 1844 (the winter of 1843–4), were the season of its greatest [illegible] nce. But although from that winter the number of places attacked [illegible] declined, there was still the next winter a decided prevalence; for [illegible] nued or recurred in many localities, and was not extinct in 1849.

When we compare the column of latitudes with that of dates, we perceive, with a few striking exceptions, that its march was from northeast to southwest, through fifteen degrees of latitude. In this respect it conformed (imperfectly) to the great typhous epidemic constitution of 1806–16, which was developed first in nearly the same region with the disease we are now considering, and advanced into the Southwest.† The same line of march was also pursued, as we shall hereafter see, by the epidemic cholera of 1832, which traversed the Interior Valley from the estuary of the St. Lawrence to the delta of the Mississippi. We are scarcely at liberty to regard these coincidences as purely accidental.

3. In every part of the very extended region through which it prevailed, there were towns and country settlements which remained exempt, while others, on every side, apparently under the same topographical, climatic, and social circumstances, remained exempt, showing the influence in this malady of the same law that governs the typhous fevers, epidemic cholera, measles, and scarlatina.

4. In reference to climate as modifying the violence of the disease, it had no influence; for, as we shall hereafter see, the disease was equally violent in the latitudes of 45°, 39°, and 32°, that is, on the banks of Lake Champlain, the Ohio, and the Lower Mississippi.

* Several pages of MS. containing these citations, are wanting, fragments only having been placed in the editor's hands. From these fragments it also appears that the author had the materials for chronological and geographical notices of the occurrence of local epidemics of the disease under consideration, at places on this continent beyond the limits of the Interior Valley, similar to those presented in the table. A memorandum states that such an erysipelatous invasion "commenced on the northern part of New Hampshire, north latitude 45°, in the year 1841, and made its way down the valley of the Connecticut River, and that it prevailed in various places east of the mountains, from that on which it originated, to the southern part of Virginia, which it reached in the winter of 1844–5."]

† See Book II. Part III. Ch. I.

5. Neither had the mineralogical and topographical character of the country any effect, as may be seen by a reference to the descriptions of the places where it prevailed, which shows that its victims dwelt upon rocks of every kind—on granite, limestone, sandstone, slate, and clay, and of every geological age, from the primitive to the alluvial; also, that it occurred on mountain slopes, low hills, and flat-bottom lands.

6. As to density of population, we may say, on the whole, that it was a rural, much more than an urban disease, and that *most* of its localities had been more recently settled than many others, which it passed over. In the cities of Quebec, Montreal, Buffalo, Pittsburg, Cleveland, Cincinnati, Louisville, St. Louis, and New Orleans, it was scarcely known, even as a subepidemic, except in their hospitals, and there it never prevailed with a violence approaching to that which it displayed in the country.

7. Referring to its connection with the seasons, we may say, that it prevailed throughout the whole, though much more in winter and spring than in summer and autumn, generally making its appearance late in November or in December; but, in some instances, in the spring. It is to be regretted, however, that most of the histories on these points are exceedingly imperfect.

8. This is not the place to discuss the question of its contagiousness; but as a deduction from the facts before us, it may be affirmed that in many of the places which have been named, it did *not begin* from contagion; for its outbreak, nearly at the same time, in various secluded country settlements and villages, scattered over ten degrees of latitude, and as many of longitude, does not allow us to believe in a contagious introduction, unless the fact were established in *each* case by positive proof, which has not been done in any one.

II. Contagion.—The conclusion which has just been drawn from the chronological and topographical history of epidemic erysipelas does not preclude the inquiry whether it ever propagated itself by contagion; for we have already seen that the typhous fevers sometimes originate from local causes, and then propagate themselves in that manner. Now, what are the evidences of contagious propagation?

Dr. Sutton,* on the approach of the epidemic, was a disbeliever in contagion, but experience led him to, if it did not confirm, the opposite conclusion. His principal facts will be found in the following condensed account of the disease, in a large family connection, which he was called to attend at an early period of the epidemic. The head of the family was John Buffington, who had three married sons, G., W., and F., and a son-in-law, Mr. Wilman. The wife of G. B. had a sister married to John Winscott.

On the 20th of June, 1843, Dr. S. was called to see G. B., living on the highlands, a little back of the Ohio River, and affected with the epidemic.

* West. Lancet, vol. ii. p. 308.

He was nearly restored by the end of the month. On the 26th he was called to see Mrs. Winscott, sister-in-law of B., who had been with him part of his illness. She had been indisposed for several days, and, passing regularly through the disease, was nearly well by the 2d of July. On the 29th of June, Mrs. B., the wife and sister, was seized with the same malady, and recovered in about a week. Mr. and Mrs. B. were, at the time, living in the family of Mr. Huffman, eight in number, and within a week after Mr. B.'s recovery, seven of them were attacked with the epidemic, in a mild degree, and all recovered. On the 5th of July, Dr. Sutton was called to see John Winscott, the husband of the woman mentioned above. This patient suffered severely, but was nearly well by the 14th. Mr. W. had three children, who, during his illness, had "swelling of the glands of the throat and neck, connected with fever," but without any affection of the skin. On the 10th, the Doctor was called to Mrs. F. B., who had been for some time in bad health, and on the 28th she died. Dr. Sutton does not tell us whether any intercourse had taken place between this patient and the first of the same name; but I refer to it to add that, during her illness, and soon afterwards, her husband and two of three children suffered attacks, which were generally of a mild character. On the day of her death, he was called to see Mrs. Wilman, her sister-in-law, in whose family there were seven other cases within a week thereafter. The family of W. B. numbered eight, of which but one escaped. The family of J. B., the father, consisted of four, all of whom had attacks. As these families occupied different houses, the disease cannot be regarded as of domestic origin. According to Dr. Sutton, it was, in a particular quarter of his range of practice, almost "confined to the Buffington family and those who were in constant attendance upon them."

Although these cases seemed to indicate contagion, the cautious mind of Dr. Sutton did not come fully up to that conclusion; for, while the disease was still prevailing, he saw "every member of a family, eight in number, attacked in *succession with bilious remitting fever.*" Still further, the consanguinity existing among the greater portion of these patients, favors the idea of a family predisposition, giving to an atmospheric remote cause a greater effect on them than on others. Finally, we are told by Dr. Sutton that from the beginning the people believed in the contagiousness of the disease, and we may suppose, therefore, that terror spreading through a family connection, from seeing one of their number stricken down, might become a powerful exciting cause. On the whole, the facts furnished by Dr. Sutton do not, I think, establish the existence of contagion, but render it highly probable.

Drs. Hall and Dexter* lean to the *opinion* that the epidemic was contagious. As to its mode of spreading, they say it was irregular and erratic; and in different localities it was strikingly modified in its symptoms. One of their

* American Journal for June, 1844.

correspondents, Dr. Barney, saw *all* the members of a family of eight attacked at the *same* time. These facts seem not to favor the theory of contagion.

On this subject, Dr. Jewett, who treated the disease in Cayuga County, New York, says, "As to its contagious character, I will only say, that attendants, and those most exposed to the sick-room, are very liable to it. In some instances, whole families have been successively attacked, as have domestics also, some of them after returning to their homes at a distance for the purpose of avoiding the danger.*

At Bloomington, Illinois, where it prevailed extensively, Dr. Henry and Dr. Colburn saw no *proofs of* contagion. Dr. Henry observed that when it began in one of the insulated settlements of that prairie country, which are always in and around the groves, it generally attacked all the families; yet he could not perceive that a contagious propagation existed. Dr. Colburn saw many who waited on the sick escape, and saw others taken down who had never seen a patient with it.

In Boonville, Mo., where it prevailed severely, Dr. Thomas saw no facts proving it contagious; but Dr. Hartt made the following observation: the wife of Dr. M. was seized, after the disease had prevailed for a while sporadically; while her husband was nursing her, he sickened with it. Mrs. O'B., the mother of the former, came from eighteen miles in the country, and engaged in nursing both, during which she was taken down. Dr. Hartt was employed to attend her, and sickened with the same malady; a fortnight after his seizure, his daughter was attacked; two days afterwards his son; and lastly, his negro boy. It must, I think, be admitted, that these seven successive cases, occurring in persons belonging to four families distinct in blood, give strong support to the theory of contagion; yet Dr. Hartt saw cases in the country that certainly had not arisen from any communication with others.

The late Dr. Dorsey of Yazoo City, Mississippi, gave me the following facts: Mrs. W. visited Tchula, where the disease prevailed, and two weeks afterwards her infant was attacked; while it was yet ill she herself was seized; her husband likewise had a slight attack; her nephew, a lad living with them, was then taken down; her sister, another member of her family, who had also visited Tchula, next sickened and died; a female friend came twenty miles from the country to visit the family, returned home and fell a victim to the same malady; a negress who was nursing them was also seized; then another who belonged to the family of the nurse was taken down; then the mistress of the slaves and three of her children. Several of these attacks were slight, yet their diagnosis was well marked; and one can scarcely avoid the conclusion that there was contagious propagation.

From Drs. Shanks and Frazier, practising in partnership, I received the

* Boston Med. and Surg. Jour.

ing statement: On the 20th of April, 1844, a man, W., without g been exposed to contagion, was seized with the disease. On the 5th May, another man, R., in the same house, who had received a wound in the right arm two weeks before, which, however, had healed, was attacked in the injured part. On the 20th, his wife, who was waiting on him, and assisted dressing his suppurating arm, was seized with the disease in her thumb, where there was a slight sore. On the 22d and 24th, their two daughters, aged twelve and fourteen years were attacked. The first patient, W., was moved to his brother's, and a girl visiting in the family was attacked and . On the 10th of May, the brother sickened with the same disease and died. On the 27th of May, Dr. Shanks was himself taken down.

These were all the developed cases which Drs. Shanks and Frazier were called to treat, and every patient, except the first, had been with those who labored under the disease, but many others who visited them continued healthy. These cases afford strong evidence of contagion; yet it is subject to this defalcation, that at the time when they occurred, a great number of persons, as Drs. Shanks and Frazier inf med me, had slight sore throats.

Dr. Capshaw* has given us the following facts: On the 20th of March, 1844, a negro woman who had lately come into the service of Mrs. E., of Whitesburg, was attacked; he administered the medicines to her, and about the 1st of April was himself taken down. On the seventh day of his disease he was visited by two children of Mr. H., who also visited the negress first attacked, and a week afterwards (April 14th), they were both attacked. On the 20th, W., a mulatto boy who spent much of his time in the house of Mr. H., was seized with the disease; on the 28th his brother and a negress, both of whom worked in the family, were attacked; and on the 29th, Mr. C., residing with Mr. H., was seized. The last four had been constantly with the two sick children.

From Dr. Paxton of Knoxville, where in 1844–5, the epidemic prevailed to a limited extent, I got the following statement of what occurred in the family of a widow, who had one son, two daughters, and a girl who was an inmate of the family. One of the daughters watched for a night with an erysipelatous patient, and soon afterwards sickened with the same disease, then her mother, sister, and the little girl, all of whom slept in the same room with her, were seized; the son, who lodged in another room, but waited on them, also took the disease; finally a married daughter, who lived in a different house, spent two nights in nursing the family, which was followed by an attack.

Dr. Robards† of Columbia, Tennessee, makes the following statement. The first case which occurred in that town was in winter, and the room in which the patient was confined was kept close. "Out of the number of persons that waited on that case, at least eight-tenths took the disease, two-

* West. Jour. (Louisville) 2d series, vol. iv. p. 1.
† West. Jour. (Louisville) vol. iv. p. 288.

thirds of whom died." A suspicion of its contagious character having arisen, "precautions were used," and no more manifestations of contagion occurred.

Dr. Keller of North Alabama, had twenty-nine cases on one plantation. It was *supposed* to have been introduced by a negro from another farm. All who waited on the sick were attacked. At length sheds were erected in a neighboring grove, to which all the negroes that could be spared from the sick, were removed. No case occurred there. "The old cabins were thoroughly renovated and washed with lime," and the people brought back to them in ten days, after which but two cases occurred.

Dr. Montgomery has given us the following facts. A young woman who was on a visit to her friends, when the epidemic appeared among them, after attending on several of the cases returned home, a distance of one hundred and fifty miles. Four or five days after reaching her father's house, she was taken down with a violent attack, and several of the family with some of the neighbors, who waited on her, sickened with the same disease, of whom three died. A negro woman was sold off a plantation where the disease prevailed, and taken thirty miles into a very healthy settlement. She was perfectly well for six days after reaching there, when she was seized with the disease and died. Several of the negroes who waited on her were attacked with the same malady, but it spread no further. Dr. Montgomery after narrating these declares that many other events of a similar kind occurred.

The following facts relate to the disease at Grand Gulf and Port Gibson, ten miles apart. The disease was prevailing in the former, when Dr. Morehead was called from the latter, to the case of a man down with it. In making an application to the throat of his patient, some of the secretions of the mouth fell on an abraded spot on one of his fingers, it soon began to inflame, and he returned home to die of the disease. Dr. Harper, one of my informants, was his principal physician as to closeness of attention, and in a few days after beginning he was seized. Two men who waited on those patients suffered attacks; and the wife of one of the attending physicians, Dr. Abbey, without having had any communication with the sick, suffered an attack, though her husband escaped. One of the cases at Memphis, and that of Dr. Morehead, seem to present us with inoculation of the disease; yet in the paper of Drs. Hall and Dexter, we are told that the inflammation commenced in an abraded spot, in the palm of the hand of a farmer living secluded in a deep forest, and we must not forget, moreover, how often sporadic erysipelas begins in some wounded or unsound spot.

The facts presented in this section seem to me to place epidemic erysipelas in the same category with the typhous fevers. Originating sometimes, if not always, from some other cause than contagion, yet in many instances spreading by that means.

SECTION III.

EPIDEMIC ERYSIPELAS, CONTINUED:—SYMPTOMS.

I. General Views.—It is far less difficult to give a readable description of the true eruptive fevers, or even of sporadic erysipelas, than of the epidemic variety. This results from the greater regularity and uniformity of the symptoms which characterize those fevers, and the greater simplicity and more external seat of casual erysipelas.

Before entering on a detail of symptoms, a few general views may be advantageously presented. 1. All the observers have seen cases in which the local affection distinctly preceded the constitutional. In these instances the inflammation generally (not always) commenced in some spot or point which had suffered mechanical injury. In the greater number of cases the constitutional and local disorders began at the same time; but in many the former distinctly preceded the latter. Here then is diversity at the very outset. 2. Those who have seen and studied sporadic erysipelas, only think of it as a disease invariably affecting the skin; liable to dip deep beneath it, or to be translated or to spread to some internal tissue, still being essentially a cutaneous affection; but in the late epidemic, the skin in a majority of the cases escaped the disease. 3. Instead of that tissue, the mucous membrane of the mouth, nares, throat, and larynx, was the constant or chief seat of the local affection. Affections of the lungs and brain, and in parturient women the peritoneum or utero-vaginal membrane of the skin, the intermuscular cellular tissue, the lymphatic ganglia, and various other parts, might, in different cases, exist, but that of the pharyngeal mucous membrane was never absent. 4. In different places, and in the same place, even in the same family, some cases were so slight as scarcely to demand medical treatment, while others proved rapidly fatal, in despite of every curative effort. 5. In all cases, when fully developed, both fever and inflammation were present. In the typhous affections there is fever with inflammation *or* simple hyperæmia: in this form of erysipelas, the hyperæmia was generally active, and copious suppuration, sloughing, or gangrene, was a common event. Having taken these general views we must proceed to details.

II. Cold or Forming Stage.—The duration of this stadium of the fever varied from a few hours to several days. In the former case a severe chill, with but few antecedent symptoms, was followed by violent fever; in the latter, the patient felt unwell,* with languor, creeping chills, loss of appetite, costiveness, a foul tongue, sometimes an irritable stomach, pain in his head, neck, back, and limbs, or in particular joints; and very often a slight sore throat. Sooner or later, the coldness or rigor deepened into a severe and often pro-

* Several of the historians of this epidemic have expressed this condition by the word *malaise*. Now, it is very right to import knowledge from France, but quite unnecessary to adopt French words, especially when, as in the present case, we have a most expressive vernacular term, used in its primary sense, while the French word is used figuratively.

tracted chill, followed by reaction and fever. The cold fit was never repeated, although, in some cases, the fever displayed a remittent type. There was a third aspect of the forming stage, in which there was general coldness, with a damp skin, a sense of sinking and oppression, a frequent and feeble pulse, and great incapacity of the system for reaction; a state similar to that in the malignant periodical and continued fevers.

It is to be regretted that those who had ample opportunities of seeing this fever have said but little on its forming stage. I have included irritability of the stomach among its phenomena, yet most of its historians have said nothing on that subject. On the whole, its first stage bears a greater resemblance to the forming stage of the phlegmasiæ than the continued or periodical fevers.

III. Hot Stage.—In many cases occasional chilliness continued to recur after febrile reaction was fully established. In some the general heat was not well developed, the feet remaining cold, and in some a profuse perspiration occurred, while the other symptoms indicated continuance of the fever. The majority, however, presented full fever heat, great thirst, a rapid and bounding yet compressible pulse, which, with a slight morning abatement, continued day after day. In persons naturally feeble or rendered infirm by previous disease, the pulse was often weak. In none, or next to none, was it tense or a pulse of power. The tongue was heavily furred, but in general had not the whiteness which characterizes the phlegmasiæ; on the contrary, at an early period of the fever the fur began to change, especially in the longitudinal centre of the organ, to the brownish hue, which in a short time overspread the whole surface.

The aches and pains of the head, back, and limbs, present in the forming stage, become still more intense in the reactive, and were often especially violent in parts over which the characteristic erythema presently appeared.

It is not possible to speak with certainty of the state of the blood. Many physicians did not draw any, and those who did have in general neglected to tell us whether it was buffy. Dr. Dawson mentions one case in which the blood on the third bleeding was sizy, and Dr. Henry, of Illinois, informed me that he bled in nearly all his cases and found the blood uniformly buffed. On the whole, however, we may believe that those who drew blood, would have reported it sizy, if they had found it so; and that their silence is an evidence, that in general it was not in a state of hyperinosis.

IV. Inflammation.—1. The surface affection in this disease appeared in every degree of violence from an early fading erythema to a disorganizing erysipelatous inflammation. The throat was its chosen seat. In many cases the very first symptom was a feeling of soreness with some difficulty in swallowing; but more commonly other symptoms of indisposition constituting the first stage of fever, appeared at the same time; and in some preceded the anginose affection, which was developed with the hot stage. The nosological terms, pharyngitis, laryngitis, tonsillitis, and glossitis, are

scarcely sufficient to represent the varieties of this inflammation. In the vigorous, when the fever was acute, the color of the mucous membrane was a bright red, but in general a darker hue prevailed. In many cases there were spots of adherent mucus, and in some patches of imperfect coagulating lymph. The ash-colored eschars and ulcers so frequent in scarlatina, were rarely observed; and suppuration of the tonsils so common in ordinary inflammation, was a rare event. The swelling or thickening of the membrane from congestion was decided, but early infiltration of serum between its laminæ and into the submucous cellular tissue, greatly added to the difficulties and danger of those cases in which the epiglottis and rima glottidis were affected. In extending downwards, the inflammation did not in general take the course of the alimentary membrane, but the respiratory, generating an erysipelatous laryngitis, treacheitis, bronchitis, pneumonitis, or simple congestion, with its characteristic symptoms and physical signs. Of all the *tegumentary* extensions of the disease, this was the most dangerous. The upward and forward extension was into the mouth and nasal passages and sinuses. The inflammation of the buccal and lingual membrane was scarcely ever initial, but generally consequent on that of the throat. In many cases the tongue remained unaffected, except in the secretions of its surface, till the disease had existed for some time, and in others it escaped entirely, was indeed pale and flabby. In cases of glossitis involving the submucous and intermuscular tissue, the inflammation undoubtedly often descended from the surface, but Dr. Dawson has described a case in which the membrane showed no signs of hyperæmia till the tongue had swollen, stiffened, and become painful, showing a deep commencement and an outward spread of the inflammation. The swelling of the organ was now and then so great as to cause its projection beyond the lips, and to render both speech and swallowing nearly impracticable. The early morbid secretions of the membrane assumed a dark color, further secretion frequently ceased, and the surface dried; at the same time, the blood lost much of its arterial hue, and the organ put on the aspect which suggested for the disease the revolting epithet of "black-tongue." When the spreading inflammation entered the posterior nares, the swollen membrane compelled the patient to breathe through his mouth, thus contributing to its dry and uncomfortable condition. In advancing, it turned aside into the frontal, maxillary, and other sinuses of the face, raising in and over them severe achings and a distressing sense of oppression. Finally, from the anterior nares it ascended the nasal ducts and attacked the eyes.

2. In many cases the inflammation spontaneously ceased, was arrested by art, or proved fatal by the lesion of respiration, while it was still limited to the mucous surfaces; but more commonly it advanced from the mouth, the nostrils, or the lachrymal ducts, upon the skin. In some cases it was limited to one side of the face and head; but much oftener overspread both. Now and then it descended upon the trunk or the arms, leaving the parts above com-

paratively uninjured; still its favorite field was the integuments of the head and face and neck, which were often enormously swollen. The swelling depended in part on sanguineous congestion of the dermoid and subjacent areolar tissue; but still more on serous, fibrinous, or purulent effusions.

True to the erysipelatous character, as the inflammation advanced it abated in the parts previously affected. To borrow an illustration from war, it moved like an invading army that does not leave garrisoned forts behind it. Thus, in numerous cases, almost as soon as the inflammation appeared on the face, its cessation in the mucous membrane was declared by an abatement of laryngeal dyspnœa, cough, hoarseness, dysphagia, pain, soreness on pressure, swelling, and redness of the throat. This signal relief was not, however, always permanent; for cases were met with by several observers, in which the cutaneous inflammation ceased, and the mucous returned in the parts first affected; and this alternation, known to happen in sporadic erysipelas, was sometimes repeated in the same patient.

But the cutaneous erythema was not always an extension of the mucous; for in many cases after the latter had continued for a few days, the former would commence on one ear or cheek, the side of the neck, or somewhere else about the head or face, and immediately begin to spread.

The local affection, moreover, did not always begin in the mucous membranes. In many instances it commenced like sporadic erysipelas in the skin, whence it entered the aerial passages, in some cases, in others it arose in them subsequently to its origin in the integument, and in a few patients the throat remained unaffected to the last. When no local injury, scratch, puncture, abrasion, or recently cured inflammation, existed on any part of the body, the erythema generally commenced on one of the ears or cheeks, the point of the nose, the angle of the eye, or the side of the neck, and proceeded to envelop the whole head and face; but if there were an infirm spot on the trunk or extremities, it generally began there; in many cases, moreover, having its commencement in the extremity of the finger or toe, which had not been injured. In some patients it overspread the skin by continuous progress, in others it ceased in one part and broke out in another; in others still, it appeared in different places at the same time. Dr. Capshaw saw it commence on the right instep, ascend to the point of the scapula, cross over to the left side, and descend to the ankle. Dr. Dawson saw it begin on the ear and overspread the whole body.

3. The appearance of the eruption was, on the whole, that of sporadic erysipelas. In the beginning, especially in vigorous subjects, of a red color; but in the feeble, and in all, after it had existed for awhile, of a dark and often livid hue. The vesicles were sometimes very minute, and contained a transparent fluid, which gave them a crystalline appearance; in other cases they were larger, and filled with a sanious fluid of a straw or dark muddy color. In a few cases, large vesicles or blebs arose without any erythema; in some instances, wheals, resembling those of urticaria, ap-

d, and in some, to be hereafter considered, the efflorescence resembled of scarlatina. In some patients, cutaneous sloughing led to the formation of superficial ulcers, and in all, or nearly all, there was an exfoliation of the cuticle. A smarting pain was always present, and occasionally there was a sense of formication.

4. The submucous and subcutaneous areolar tissue was ravaged by the disease in almost every violent case. Severe and tensive pain, swelling, and heat, indicated the development, primary or secondary, of this phlegmonous inflammation. It was very often seated beneath that spot of the skin on which the erythema first appeared, and in many cases seemed to commence before the cutaneous affection. Rapid and copious effusions ensued. These, in the milder cases, and the beginning of all, were serous; but very soon that fluid was rendered turbid with flakes of fibrine, but little prone to unite the surrounding tissues; an early secretion of pus of an abnormal character added a new and more deleterious ingredient to the compound; in some instances more or less blood mingled with the fluid mass, and finally, dead and detached portions of areolar tissue contributed to the heterologous accumulation, which was not confined to a cavity by walls of false membrane, but diffused itself beneath the integuments, and among the muscles, tendons, arterial trunks, and nerves. In some cases, large portions of muscle were said to slough away in this putrid sanies, which was so acrid that it would inflame the sound skin over which it was permitted to flow, and, according to Drs. Hall and Dexter, so constituted chemically, "*that the hardest steel was directly penetrated by it as by nitric acid.*" In other cases, instead of this most abnormal suppuration, the parts lost their vitality and became gangrenous.

5. The salivary glands and lymphatic ganglia suffered not less than the areolar tissue. The sublingual, buccal, and parotids, in whole or in part, never escaped when the mouth or throat was affected. In some cases they became the seat of pain and swelling, even before the mucous membrane or the skin. Now and then they were the seats of suppuration, or became involved in that of the surrounding areolar tissue. When the disease commenced on a limb, the lymphatics extending to the neck, axilla, or groin, often became inflamed. In numerous instances the ganglia of the neck were seriously swollen and painful, quite as early as the mucous membrane was affected, and sometimes before. They were often involved in foul suppurations, and those of the axilla and groins did not wholly escape the disorganizing process.

6. Deep-seated pains and achings have been already mentioned as characteristic of this disease. The head, the trunk, and the limbs,—all parts of the body, indeed, where the white fibrous tissue, whether under the names of periosteum, perichondrium, or pericranium, is found, were the seats of these pains, which, from their frequent change of place, and the absence of external signs of inflammation, were called neuralgic. This view was

often correct; yet, in many instances, a destructive periostitis did occur, separating the muscles from the membrane, and detaching it from the bone. In other cases the inflammation of the surface descended to the bony structure. In both the result was a putrilage, which, if not freely evacuated by art, diffused itself extensively among the tissues. In some cases the bone itself yielded to the morbid action, and a case fell under the observation of Dr. Jewett, as reported by Dr. Hall, in which "a large portion of the external table of the skull" exfoliated.

7. Closely connected with this was the development of meningeal inflammation in the brain, so common and so much dreaded in erysipelas, both sporadic and epidemic. The histories of this invasion do not indicate that such inflammation was frequent. In some cases it no doubt *began* within the cranium, but in others it entered from without, permeating, as it were, the bony structure, or passing through the foramina provided for the blood-vessels. The cerebral complication was marked by vertigo, headache, delirium of a low kind, subsultus tendinum, and deep coma. These symptoms do not, it is true, necessarily imply inflammation; but from the general character of the epidemic, we may infer its existence. Unfortunately for the interests of pathology, not a dissection of the brain, as far as I can find, was made.

8. The extension of the inflammation from the throat to the bronchial tubes has been already mentioned. It did not, however, limit itself to them, but attacked the air-cells, the connecting areolar tissue, and the pleura. Hence pneumonia and pleurisy were common occurrences; and declared themselves by the usual symptoms and physical signs during life.

The affection of the lungs and pleura was not always secondary to inflammation of the throat or skin, but on the contrary it frequently commenced with the fever, and in some cases occurred without either mucous or cutaneous erythema; yet, as such cases were mingled with others in which the pulmonary affection was consequent on the pharyngeal or dermoid, they were very properly regarded as the offspring of the same cause. It was observed that when pneumonia or pleurisy existed, either as a primary or secondary affection, the blood was sizy; yet the loss of a few ounces from a large orifice, according to Dr. Sutton, produced syncope. In Canada, Dr. Colby encountered the same erysipelatous pneumonia, but in that higher latitude, copious and repeated venesection, affording sizy blood, was well borne. The involvement of the lungs was not confined to the higher latitudes, for Dr. Wharton and Dr. Tuck witnessed it on the Lower Mississippi.

9. The inflammation, judging by the symptoms, rarely invaded the mucous membrane of the stomach. A certain degree of gastric irritability existed in many cases, but vomiting, anguish, tenderness under pressure, limited to the epigastrium, and other reliable signs of gastritis, were not common, though several physicians occasionally met with such cases. The symptoms of mucous enteritis were still rarer. The bowels were easily

diarrhœa scarcely ever occurred. The perito- parturient women was obnoxious to the inflammation, degree as the pleura. Pregnant and especially lying- however, peculiarly liable, and the most fatal cases were nothing, however, on the history of these cases here, studied under the head of Puerperal Fever.

SECTION IV.

EPIDEMIC ERYSIPELAS, CONTINUED.—PATHOLOGY.

and limited erysipelatous inflammation may exist without whenever the topical affection is severe, that constitutional present. When the inflammation occurs first, it is said to pro- fever; and this might be admitted, if we did not observe that in cases the latter arises with the former, or quite as often distinctly it. I suppose the truth to be, that the local and constitutional stand in the same relation to each other, as we have endeavored they do in autumnal, yellow, typhous, and the exanthematous ; and as in each of them we have recognized a peculiar febrile and inflammatory type or diathesis, so we should recognize as a peculiar, or ery- sipelatous diathesis, the disease we are now studying.

When the disease appears as an epidemic, it depends on some undiscovered cause. When sporadic it depends on different equally unknown causes, in all of which it may be compared with the typhous fevers.

The peculiarities of erysipelatous inflammation are chiefly the following.

1. Its disposition to spread over the cutaneous, mucous, and serous sur- faces, especially the first, in which it generally takes some definite direc- tion, and in many cases cannot be arrested; but continues to the extremity of the part on which it originated, and expires on reaching it. Thus be- ginning on the arm, it may pass off at the extremities of the fingers; or on the side of the neck or face, it may cease on reaching the point of the nose or ear. On the other hand, commencing on one of the limbs it may take the direction of the trunk of the body. In doing this, it sometimes crosses the median line, and travelling in the reverse direction on the opposite side, may reach a point corresponding to that at which it commenced. We may cer- tainly admit the reality of this peculiarity without being able to explain it.

2. Erysipelatous inflammation is eminently destructive of the tissues in which it occurs. In this ready yielding of the tissues we may, I think, trace a previous lesion of the vital properties, for the characteristics of true inflammation frequently bear no proportion to the disorganization which they produce. A part of these ravages depend on a great secretion of serum or a serous fluid. Thus the skin becomes covered with vesicles, and even blebs containing opaque fluid; and the subcutaneous areolar tissue, as that

of the face or the larynx, becomes highly edematous. This serum often contains the fibrine of the blood; but not in sufficient quantities, or of such a true inflammatory kind, as to occasion adhesions. An early and often profuse secretion of pus may occur, but it is generally thin and often ichorous, and not being confined by the barriers which ordinary inflammation sets up, spreads abroad in the tissues and contributes to their disintegration.

3. The vital forces of the affected parts are apt to fail, the congestion meanwhile continuing, and giving to the parts the dark or sublivid aspect which indicates a stasis of the blood in the capillary vessels. A tendency to gangrene, and the death of the part, is indeed a frequent event in this variety of inflammation; and sometimes manifests itself without its previous occurrence in a well-developed form.

II. The fever in erysipelas harmonizes well with the inflammation. In the most acute cases the pulse scarcely ever reaches the strength and hardness which are characteristic of the phlegmasiæ; the drawn blood very seldom exhibits a state of hyperinosis; in many cases which seem to demand bleeding the forces of the circulation give way under a small abstraction; in others the fever is never developed with intensity, and at an early period, although the inflammation may be still spreading or at least show no signs of resolution, the physician is restrained from further depletion, or the use of any debilitating agents, and obliged to resort to tonics and stimulants. As still further characterizing both the fever and inflammation, we may refer to the great tendency of the latter to leave one part of a tissue and appear on another, or to abandon one tissue and attack another. Finally the exhalation from the inflamed part or from the general system, is sometimes a real contagion, raising the same form of disease in those exposed to it. With these facts before us, we cannot, I think, deny that the disease now under consideration has a pathology of its own; and although its diathesis be not as strongly marked as that of small-pox, it is at least as well expressed as that of the autumnal or typhous fevers.

Its complication with those and many other forms of fever is a well-known fact. Thus, as we shall hereafter see, it is often joined with puerperal peritonitis, and in some parts of our Valley has been signally modified by scarlatina; when it occurs during the reign of the true phlegmasiæ it always puts on a more inflammatory character, while if a typhous epidemic constitution should prevail, it assumes an adynamic character; and finally when it occurs in malarial regions, the fever sometimes assumes a remittent type; and occasionally the patient, as I lately witnessed, perishes as if in the paroxysm of a malignant intermittent. This great liability to be affected by the causes which produce other forms of fever, gives much diversity to the erysipelatous type, and forbids a reliance on any uniform method of treatment so successfully followed in the phlogistic or periodical fevers.

incapable of prying deeper into the pathology of this disease, and ceed to speak of the treatment, chiefly according to the experience physicians during the late epidemic.

SECTION V.

EPIDEMIC ERYSIPELAS, CONTINUED:—TREATMENT.

I. We can raise no valid objection to the opinion that erysipelas is a pe- fever, from the fact that treatment frequently arrests it; for autumnal ever, syphilis, and goitre are peculiar maladies, and yet they may be ted. Still, though often cured, in many cases it proves fatal, and should always be regarded as a dangerous disease. It will be proper, first, to say something on the means of arresting it in the early or forming stage.

II. When the constitution is good and fever has not yet become developed, the topical treatment is most likely to be successful. The erysipelatous diathesis of the organism is not yet fully established; the disease has more of a local character, and is of course more amenable to local treatment. When that treatment fails—when the inflammation passes over the circumvallation produced by the caustic, or, arrested at the point of first outbreak, appears in some distant part of the body, whether cutaneous, mucous, serous, cellular, or fibrous, it is because there is a constitutional lesion. The various functions may not yet have appeared in disorder, but the access of fever is near. In this stage of incubation, and subsequently up to the full development of a hot stage, vigorous efforts should be made by constitutional treatment, for there is a prospect of cutting short the disease. It will rarely happen that bloodletting is proper in this stage, yet cases may occur in which the state of the pulse will demand it. Of all the means within our reach, emetics or emetico-cathartics are undoubtedly the best. The vomiting should be free, and the purging of that kind—cholagogue—that will give bilious discharges. These evacuations should be followed by gentle sudorifics, such as Dover's powder, or a compound draught of paregoric, wine of ipecac., and spirit of nitrous ether, to be followed by some diaphoretic infusion. If these measures with the local treatment should not succeed, the fever will, of course, soon become established, and we must now review the means of cure adapted to the disease in its full development.

III. As no fever presents more destructive inflammations than erysipelas, it might at first view be supposed that bloodletting would be a chief remedy; but experience has not borne out this supposition. The phlogistic diathesis is so modified in this fever, that in many cases the progress of the inflammation is not arrested by venesection, and, in some, the vital powers are so enfeebled by the loss of blood as to show that the lancet should not have been employed. When the inflammation has attacked the fibrous structures of the joints and bones, simulating rheumatism, or the serous membranes of

the great cavities, presenting us with the phenomena of meningitis, pleuro-pneumonia, or peritonitis, the lancet was most efficient. When confined to the skin, mucous membranes, areolar tissue, or lymphatic ganglia, bloodletting afforded much less relief, and in many cases, in the North as well as in the South, either did harm, or was so manifestly contra-indicated, as not to be employed. The cellular and glandular suppurations and sloughings were not prevented by it; and the atony which followed on the loss of blood rendered those disorganizations still more dangerous to life. In cases requiring the lancet, a single operation was generally sufficient; yet two or three were occasionally found indispensable. Those bleedings in which the flow was copious in a short time, were found most effective; and if it happened that the loss of blood was improper, the injury done was much less than when the same quantity was abstracted slowly. In all cases, the earlier the bloodletting after the stage of reaction has arisen, the better was the result; when the work of effusion, suppuration and sloughing had become established, but little relief was experienced, even in cases which might have been arrested or greatly mitigated by an early resort to that remedy. The fever in this disease was very generally prone to slide into an adynamic or typhous character; or, in localities infested with periodical fevers, into that kind of collapse or sinking of the vital powers, which constitutes an essential element of the malignant paroxysm. It was these tendencies more than any other that contra-indicated bloodletting, and especially rendered its repetition improper after the first three or four days. I have said that venesection was not so necessary when the inflammation was seated in the mucous as the serous or sero-fibrous membranes, but from this remark we must except invasions of the lining membrane of the larynx, causing an œdematous laryngitis. The imminent danger of suffocation when the inflammation had that seat, rendered copious and repeated venesection indispensable, although it might not at all times prove effectual. While the disease was epidemic in Mississippi, Dr. Harper, of Port Gibson, after attending a medical friend who died of it, took a shower-bath at bedtime, and found himself in the morning with fever, hoarseness, and aphonia. The sense of constriction in the glottis was such as to suggest inevitable suffocation. Deglutition was difficult and considerable coma and delirium speedily supervened. He was bled three times in one day, and I saw him a few months afterwards in good health.

I have endeavored to trace out the influence of climate and topographical aspect on the influence of bloodletting in this malady, and find that it was employed and repudiated by different physicians in the North and in the South. Thus in the latitudes of forty-three, four, and five degrees, a large number of practitioners omitted it entirely, and in the latitudes of thirty-two and thirty-three degrees, several, as Dr. Wharton, of Grand Gulf, found it beneficial. In low valley plains, infested with periodical fevers, bloodletting was less admissible than on the hilly lands; and yet this statement must be

me exceptions, for on the prairies of Illinois, which, although
largely of the character of alluvial valleys and are infested
fevers, Dr. Henry, at Bloomington, bled most of his patients
d it not only safe but beneficial.

has taught me that the estimates of our physicians on the
odletting in this and many other febrile diseases, are to some
ed by their education. We every day see physicians (being
achers) living in the same localities, who entertain widely
ons on the subject of bloodletting, and present in its employ-
versity; some resorting to it in almost every form and grade
se, while others employ it hesitatingly even in the most vio-
al professional descendant of Dr. Rush is ever ready to use the
nerally sees it do some kind of good, while a traditional fol-
wn, or of some physician who grappled with the spotted fever
land from 1806 to 1812, as generally sees in venesection the
ever evil may *follow* on its employment. Even the intellectual
the physician will influence him in the employment of this
peutic agent, more perhaps than any other. Thus, of two
educated alike and taught the same doctrines and practical pre-
who is of a bold and reckless temper is quite certain to bleed more
and copiously, under the same circumstances, than the man of a
and timid spirit; and each will be, to some extent, incapable of
ating the consequences of doing too much or too little.

IV. EMETICS, at all times more or less employed in the treatment of sporadic erysipelas, were very generally used in this epidemic, and the testimony in their favor, is, on the whole, more decided than that in favor of venesection. They were regarded as applicable to a greater number of cases, and their operation was never followed by effects of a doubtful character. My own experience would lead me to confide in emetic medicines, especially tartarized antimony, in erysipelatous fever, more than I would confide in any other contra-stimulant or antiphlogistic medicine. These medicines, we know, have a specific influence on the tegumentary membrane. Thus they promote perspiration, they act also on the alimentary mucous membrane, as we see from the increased secretion in the mouth and pharynx under nausea, and from the liquid alvine discharges which follow the union of minute doses of tartar emetic with cathartic medicines; finally, above all other medicines, they re-establish and promote secretion from the mucous membrane of the respiratory passages. As contra-stimulants, they lower the tone of the sanguiferous system, with an energy unequalled by anything but the lancet, and, at the same time, from that specific influence on the capillary vessels which enables them to increase the secretion of the tegumentary system, they abate congestion wherever it may exist. These various effects may occur independently of vomiting, and in cases highly phlogistic it may be well to aim at their production with doses that merely nauseate; but

after free venesection in such cases, and in others where the arterial excitement does not run high, but the inflammation either spreads rapidly, or assumes that aspect which indicates a failure of the vital forces, full vomiting is greatly to be preferred to protracted nausea, and is almost invariably followed by an abatement of fever, congestion, and inflammation, with an improved condition of the vital susceptibilities. If vomiting be attempted when the tone of the heart and arteries is great, the operation will be imperfect and unsatisfactory in its results. If it be postponed for several hours after bloodletting, it will be less beneficial. The proper time is the earliest practicable period after the bleeding. The first portion of the emetic may even be administered before the vein is opened. The beneficial influence of vomiting, and the exemption from all injurious effects, are greater immediately after the loss of blood than at any other time. Still further, if it should be that the bleeding was more or less improper, and the vital powers are about to fail in consequence, early and full vomiting will arrest the sinking and bring on reaction. In the economy of the living system, spontaneous vomiting is a preventive of syncope from loss of blood. The patient who vomits under venesection, seldom faints.

When the phlogistic diathesis runs high, tartarized antimony is the best emetic. It may be administered alone, or in a solution of nitrate of potash, or in powders of the same medicine with calomel, or in an infusion of lobelia inflata. When the energy of the circulation is small, tartar emetic may be advantageously exchanged for ipecac., which may be administered alone, or in the lobelia infusion, or, as was done by Dr. Dawson, in a solution of common salt. When the throat is greatly affected, capsicum may be advantageously added to the salt and ipecac., for the sake of its action on the inflamed membrane. It may be advantageous to vomit the patient for two or three successive days; but the greater part of those who treated the late epidemic administered but one emetic. The laryngeal and pulmonary complications are those which most require a repetition of emetic medicines. In advanced stages of the disease, when extensive suppurations and sloughings have occurred, or a great capillary stasis is about to be followed by gangrene, a stimulating emetic of rapid operation will so improve the sensibility and irritability of the system as to give to the tonics, stimulants, and gentle narcotics, then indicated, an influence which they might not otherwise exert. One or two other evacuations should follow that produced by vomiting, and to them we must now give attention.

V. Cathartics.—Purging was still more constantly employed in this epidemic than vomiting. It is most efficacious when it immediately follows the vomiting, is thorough in emptying the cells of the colon, promotes a free secretion from the liver and mucous membrane, and is not allowed to continue very long. Under these regulations it removes all irritating substances from the bowels, reduces the force of the heart, and relieves the inflammatory condition of the skin by introversion of blood. When the

integuments of the face and head, external or internal, are the seats of inflammation, purging is not only safer, but more beneficial than vomiting, as it diverts from those parts more effectively than any other therapeutic agency, and when the fibrous textures of the extremities are chiefly affected, presenting a *quasi* rheumatism, purging is equally proper; but when the respiratory apparatus is the chief seat of lesion its power is much less.

The best cathartics are calomel and the purgative salts, to which an antimonial may be advantageously added. Indeed, an emetico-cathartic, as a solution of Epsom salt and tartarized antimony, or the latter with nitre and calomel, as mentioned under the preceding head, or a powder of calomel jalap and tartar, are the very best cathartics in the common run of cases. When the powers of the system are greatly reduced, if it should still be thought advisable to act on the bowels, an infusion of senna and gentian, or castor oil with oil of turpentine, will be most proper. In cases where the peritoneum is chiefly involved, the best cathartic is calomel in five or ten grain doses, alternated with one or two drachm doses of castor oil.

VI. Sudorifics.—An important part of the benefit produced by vomiting and by emetic medicines, is the tendency to diaphoresis which follows their administration. This tendency should always be promoted by a suitable regimen, and the appropriate adjuvants. To patients, who had not been previously costive, and have no abdominal distension, we may often, with advantage, administer sudorifics immediately after the operation of the emetic, postponing evacuation from the bowels till that from the skin has been promoted, or we have failed in the effort to accomplish this. As a general rule, some preparation of opium should invariably find a place in our diaphoretic formulæ. The irritability following on rapid and copious depletion, and the burning pain of the inflamed parts, require in many cases a liberal opiate. Repose must be produced, or there will be no perspiration. As to the other ingredients, it cannot be important which are chosen. By different physicians a great variety were employed, and all, perhaps, with equal advantage. Should the febrile excitement be moderated by the measures which have been pointed out, and a diaphoresis be established, the inflammation will commonly cease to spread, and very soon begin to fade away. The perspiration, however, may prove transient or partial, the pulse may re-acquire its morbid energy, and the condition for which the first evacuants were prescribed may be reproduced. Under such circumstances, a second bleeding may be of signal service, the sudorifics being unabatingly continued; or if the physician doubt its safety, the nauseating element of the diaphoretic doses may be so augmented as to occasion vomiting. In either case, a favorable perspiration, with sleep, is likely to follow. The antiphlogistic line of treatment here pointed out, is one of decided power, but of brief duration of effect. Its energy and brevity of action are the sources of its success. The earlier it is employed the better. After the second or third day from the access of the fever, its efficacy will

be altogether doubtful, and at whatsoever time commenced, it cannot be continued longer than two or three days. Œdematous infiltrations, suppurations, sloughing, or gangrene, with failure of the constitutional energies, are impending events, and, once begun, contraindicate further depletion.

VII. Stimulants and Tonics.—As in sporadic erysipelas, so in the late epidemic, these medicines were sometimes demanded. Infancy, advanced age, a nervo-phlegmatic temperament, a constitution broken down by excesses, or some actual chronic disease, especially when accompanied with a local lesion, were conditions which, in different patients, interfered with the full development of inflammatory fever and inflammation. The former partook largely of an adynamic type, and the latter of passive hyperæmia, tending to disorganization of the tissue, but not by active inflammatory action. In many instances, moreover, although the access of the hot stage seemed to threaten a fever of high excitement, adynamia followed on moderate depletion, and demanded an early change of treatment. It was always useful to connect the administration of stimulants and tonics with diaphoretics, to restore or maintain the functions of the skin, while the innervation and circulation were invigorated. The latter was, indeed, indispensable to the successful maintenance of the former, and, at the same time, a free secretion from the skin was one of the safest guarantees against injury from excessive or untimely stimulations. It is not necessary to go into details under this head. The stimulants commonly employed were spiritus Mindereri, carbonate of ammonia, camphor, opium, and wine or brandy; the tonics, bark in decoction, with one of the mineral acids, and the sulphate of quinine.

The more acute the inflammation in the beginning, the less was the necessity for those medicines in the more advanced or closing stages, except when extensive suppurations made their usual demand for corroborants and nutrients. There were, however, two or three modifications of the erysipelatous diathesis, which especially demanded the remedies now under consideration. Whenever, as frequently happened, and much more in some localities than others, an early or decided development of typhous symptoms occurred, it was necessary to meet them with stimulants. But in this disease, as in the primary typhous fevers, the symptoms of disordered innervation were sometimes dependent on simple irritation and adynamia of the brain, at other times on an extension of the inflammation to the membranes of that organ; and the differential diagnosis was not always clear. In some cases of this kind, Dr. Hall gave tartar emetic and opium combined, with the happiest effects.

Another modification of the erysipelatous type, was what may be called the malarial. In some southern localities, the phlogistic diathesis was but little developed, the fever displayed an obscure periodicity, with a tendency to what is there called collapse, under which circumstances the early and

...ral administration of the bark or the sulphate of quinine with opium or of its preparations, was indispensable to the safety of the patient.

A third condition of the system demanding an early resort to excitants and corroborants, was the alcoholic cachexia giving a special tendency to gangrene of the inflamed parts, and from the outset rendering all active depletion, except by vomits, improper.

In forming a judgment as to the use of internal stimulants and tonics, the condition and aspect of the inflamed part afford important information. Acute pain, great tenderness under pressure, tension, and (for this kind of inflammation), a bright red, declare that internal stimulation is not demanded. On the other hand, the comparative absence of these symptoms with œdema, and a dark or livid hue, admonish us to refrain from all reducing measures, and push those which may support the vital powers.

Topical Applications.—1. *Local bleeding* was often resorted to and seems to have been serviceable. Being in a great degree a country epidemic, leeches were not within the reach of those on whom the treatment chiefly rested. Nor were cups often applied to the inflamed surface. Simple scarification with the lancet, scalpel, or bis...ury, according to the depth of the inflammation, was, however, very gen...ly practised, and the incisions were found to bleed freely. In this manner the throat was often promptly relieved; and some cases of œdematous laryngitis which proved fatal might perhaps have been arrested if the scarification had been carried to the rima glottidis instead of being limited to the palatal arches and intervening tonsils. When the disease assumed the character of glossitis, and the tongue became swollen, suggesting the popular appellation of black tongue, deep longitudinal incisions afforded great relief. When the subcutaneous areolar tissue was filled with serum to distension, punctures drained it away to the comfort of the patient; and when deeper-seated secretions of sero-fibrinous or purulent fluid began to form, incisions of corresponding depth, with warm fomentations to encourage the flow of blood, were found highly beneficial.

2. *Nitrate of Silver.*—I have already spoken of this medicine as employed to arrest the formation of the disease. It remains to say that it was employed by most of our physicians in every stage of the inflammation; not only to prevent its extension, but to cure it in the surfaces where it had become established. The reports of its effects are various and contradictory. Applied to the sound skin, it sometimes prevented a further extension of the erythema; but not so constantly as to inspire great confidence in its power. Applied in strong solution over the inflamed surface, it was said to subdue the inflammation, but we must recollect that it is the nature of this erythema to die away in the parts over which it has travelled, and therefore we may readily mistake a spontaneous abatement for one produced by our remedies.

3. *Corrosive Sublimate.*—The publication of the experience of Dr. Trip-

ler, U. S. A., with a solution of the deuto-chloride of mercury, was made in 1842,* yet I do not discover that many of our physicians adopted the practice which he declared had been signally successful in his hands. In all his patients the face and head were the seats of the inflammation. It was not immediately arrested, but as nearly every one escaped an extension or translation of the disease to the brain, he came to the conclusion that the solution protected that organ. His formula was a scruple of the deuto-chloride to the ounce of distilled water, applied several times a day over the inflamed and the immediately surrounding healthy skin. The Doctor cites Dr. Pitcher, late U. S. A. surgeon, as authority for the practice, and says, that gentleman had found it eminently successful. Dr. Dawson, however, informs us that his trials with this medicine gave no satisfactory results.

4. *Tincture of Iodine.*—No topical application to the inflamed skin was more frequently made than this. It was spread over both the inflamed and the adjacent sound surface. When the fever was intense it did no good, but rather increased the anguish of the affected part. In milder cases, however, it frequently arrested the inflammation. To a difference in the state of the general system, we may perhaps ascribe the diversity of reports on this as well as some other topical applications. In the Louisville Hospital this was a standing application, and as the erysipelatous patients were assigned to the surgical ward, Prof. Gross had opportunities somewhat extensive for observing the effects of this compared with some other applications. The result was a decided preference for the iodine over every other.

5. *Blisters* were of course employed by the majority. In some cases they arrested the spread of the inflammation, in others they failed. When the difficulty of swallowing was great, or the condition of the larynx threatened suffocation, applied to the nucha they often gave relief, and in affections of the lungs, pleura, peritoneum, and dura mater, they were equally beneficial.

I have enumerated the local applications most relied upon; but many others were employed with, perhaps, equal advantage. Of these I may name the following: solutions of sulphate of copper; of muriate of ammonia; of sulphate of iron; and of acetate of lead; diluted tincture of camphor, spirit of turpentine, mucilage of elm-bark; a liniment of olive oil and wheaten flour; mercurial ointment, common lard. It is obvious, that applications so very different in therapeutic qualities, could not be equally well adapted to the same cases; but we may admit that all were useful when used discriminatingly. But how can such discrimination be exercised? I am compelled by experience and inquiry to believe that the criteria by which to select the topical applications in this acute, not less than many chronic affections of the skin, are as yet but little understood, and perhaps will never be very obvious. It has long seemed to me, that the practice with these agents was essentially empirical and tentative; it will, I fear, continue so. That they

* West. Jour. (Louisville), for December, 1842.

liberal administration ... they are always used in con-
one of its preparation ... t be quite impossible to decide
A third condition ... the internal. That the latter is
and corroborants, ... ner is, I think, quite certain; and
gangrene of the in ... any cases the cure depends entirely
pletion, except by ... applications may receive the credit.
In forming a ... least, for the opposite reports made
the condition an ... of the same application. One has
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inflammation) ... apparent results were different. In the
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TOPICA ... with an early failure of the vital forces, and a
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leeches ... roat were almost as various as those to the skin.
rested. ... sion of rose petals acidulated with muriatic acid,
ficatio ... um, the tincture of myrrh, a tincture of oil of
inflam ... m Arabic, tincture of iodine, solution of nitrate of
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liev ... effects of applications to the skin are appropriate to
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PART FIFTH.

PHLOGISTIC FEVERS: THE PHLEGMASIÆ.

CHAPTER I.

COMPARISON WITH THE PREVIOUS GROUPS—CLASSIFICATION.

SECTION I.

COMPARISONS AND CONTRASTS.

I. Every fever referred to in the four groups which have been studied, may be, and often is, complicated with inflammation; yet, as we have concluded, the former may exist without the latter. In the phlogistic or inflammatory fevers, at which we have now arrived, inflammation is always present, and may, so to speak, exist and run its course without fever; that is, according to its extent or intensity, it may or may not cause that morbid affection of the general system. This view assumes that the fevers now under consideration depend on inflammations as their (pathological) cause; but this is not universally true, for we often see the signs of fever as early as those of inflammation, and sometimes earlier, in which case they are the twin brothers of a common parent with the order of their delivery reversed. And here we perceive a connecting link between the phlogistic and other groups of fever, all of which in their progress are liable to develop or become combined with inflammation. As a general and provisional expression *they* may be said to cause inflammation, while the phlegmasiæ are caused *by* inflammation. But whether the inflammation breed the fever or is generated thereby, it becomes the chief cause of danger in every febrile disease, and presents us with another element of identity—another pathological trait common to the whole.

II. As might be expected from what has just been said, while *post mortem* inspections often fail to reveal the signs and effects of inflammation in persons who have died from the fevers of the groups we have been studying, such ravages are never absent after death from the fevers we are now to

y. Still further, the anatomical characteristics of the secondary inflammation, or that produced by the fever, are not exactly the same as those of the primary inflammation, or that which produces the fever. A copious effusion of strongly coagulating and plastic lymph, an early suppuration, or a tendency to gangrene, characterize this inflammation, and present derangements of structure which are unmistakable; but in the secondary inflammations, although the sanguineous congestion may have been great, the effusions are more serous than fibrinous, the adhesions and consolidations of structure less, and both suppuration and gangrene of rarer occurrence.

III. In harmony with these traits of morbid anatomy, are the symptoms which have at all times been taken as signs of inflammation and (inflammatory fever) a phlogistic diathesis, the most constant and characteristic of which are exalted sensibility and great activity of calorific function in the part affected, a hard or resisting pulse, and a state of hyperinosis or increase in the fibrinous element of the blood. The inflammatory orgasm indicated by these symptoms is commonly greatest the early stages of the fever. Diminishing by time or under the influence of treatment, both the inflammation and the fever may become subacute or chronic. The fever may at length cease, leaving the inflammation which had caused it to run a more protracted course. If the local affection, however, should be subdued, the fever will cease, unless a *secondary* inflammation should have been established. When this happens, and the primary inflammation is cured, the case becomes in a manner identical with those fevers which do not arise from but generate inflammations, all of which are prolonged or aggravated by the reactive influence of the local affections which they themselves have generated. Yet there is this difference between the phlogistic and the other fevers, in the aspect we are now viewing them, that when the secondary inflammation in the former is subdued the fever ceases, but it may be subdued in the latter and the fever still continue.

IV. The febrile diathesis of all the phlegmasiæ or phlogistic fevers is substantially the same. Passing by the seat of the inflammation, these fevers have as true and well-marked specific characters as the various modifications of autumnal or periodical, or the different forms of typhous fever; and referring to the constitutional affection only, we might speak of one disease, an inflammatory fever. Yet even thus viewed there is room for varieties of type, which result chiefly from what has led to distinct nosological designations, everywhere received, viz.: the seat of the primary inflammation. Thus, when the inflammation is seated in a serous membrane, the febrile type is not the same as when seated in a mucous membrane, yet it is in both cases phlogistic. The diversity of symptoms, however, which the phlegmasiæ exhibit, is not so much found in the character of the fever as in the functions of the organ in which the inflammation is seated; and the new symptoms which may spring up in the progress of the fever do not so much depend on any change in the constitutional diathesis, as on the

supervention of a secondary inflammation in some other organ. This modification of the symptoms from supervening inflammation is not confined to the group now under consideration, but is more or less true of all the groups through which we have passed. Thus, when in different cases of autumnal remittent, the brain, the stomach, or the liver, becomes the seat of inflammation, the character of the disease undergoes a decided change; and in continued fever the localization may be in the brain, the lungs, the stomach, or the ileum, whereby, or whereupon, the symptoms are so modified as to suggest to one nosologist distinct species, while another regards them but as the necessary results of the different seats of the secondary congestions or inflammations. Yellow fever and the eruptive fevers present us with similar facts, and appear to suggest the existence of a law of modification common to all febrile affections.

V. In our diagnosis of the phlogistic fevers, our attention is most pointedly turned to the symptoms immediately connected with the affected organ; in diagnosing the other febrile diseases we look more to the disturbances of the organism at large. The inflammation fixes our attention in one case—the fever in the other. Thus we pass lightly over the constitutional symptoms, but labor patiently to decide whether the inflammation is seated in the stomach or the peritoneum, in the mucous, cellular, or serous tissue of the lungs. But in our periodical and continued fevers we find little room in the beginning for such inquiries, and pronounce one bilious remittent, another typhous, while as yet we have discovered no primary local affection. The same thing is true of yellow fever and natural small-pox. It would be illogical to affirm that these different modes of diagnosis prove, that while the phlogistic fevers have an inflammatory origin, the others have not: yet it must be admitted that if such were the fact, the present differences in our methods of diagnosis would be those we should still employ.

VI. The phlogistic fevers are essentially and decidedly continued, and in that respect stand in strong contrast with autumnal fever. Yet an acute secondary inflammation, established early in the latter, may transform it into a phlogistic fever with slight remissions, such as a true phlegmasia exhibits when it begins to decline. These two forms of fever can and indeed do signally modify each other, as we shall hereafter see. Widely as they differ in many points they concur in others. Thus, left to themselves they run on indefinitely, yet both may at last terminate in health independently of treatment. Both, moreover, may be arrested by remedies, though of a different kind. Compared with yellow fever the phlegmasiæ differ in being curable and not self-limited, while that fever is self-limited, and in general not curable. The continued or typhous fevers may, like the periodical, be changed into *quasi* phlegmasiæ, and in turn may greatly modify the type of the latter. The two forms differ essentially in their relation to therapeutic agencies, the phlogistic yielding to them, while the typhous with in-

definite self-limitation holds on its course, to terminate, in health perhaps, after all medication has been given up. It is well known, that when a phlogistic diathesis is epidemic, it gives to the eruptive fevers a more inflammatory type, and favors the development of secondary inflammation. The two groups are identical in unabated continuity; but they differ signally in this, that while the phlegmasiæ, if not cut short by therapeutic measures, continue indefinitely, each of the true eruptive fevers, resisting such measures, is strikingly self-limited.

VII. It is in their etiology that we find the greatest contrast between the phlogistic and the other forms of fever. Most of the latter result from specific agents, of a deleterious character. Of this kind are the morbid poisons which cause the eruptive fevers, the malaria which generates periodical fever, that which originates yellow, and those which seem to produce the typhous fevers. Should it appear, hereafter, that any or all of these maladies are not the result of peculiar poisons, they would still be referred to respectively a *peculiar* combination of agents or influences, with which the causes of the phlogistic fevers would stand as much in contrast, as they stand with specific poisons. An enumeration of the principal causes of the phlegmasiæ, especially those of our own country, will be made hereafter. It will be sufficient for our present purpose, to say, that they are not agents which possess inherent morbific properties, but largely the opposite; that is, they are sustainers of life; and become causes of inflammation and fever, by being applied in excess, or (indirectly) by being withheld, by improper combination, or by untimely or misplaced application. Thus they are the things in the midst of which, and by which, to employ the beautiful language of holy writ, we "live, and move, and have our being." It is easy to perceive, and admit, that an inflammation and fever raised by such agency must differ widely and favorably from the effects of any agent, that is from the causes which, *malum per se*, produce the fevers of the other groups. In the phlogistic fevers the inflammation may be violent, the fever acute, the phlogistic diathesis intense, but to speak in metaphor, the lateral departure from the right line of health, the deterioration and degradation of both solids and fluids must be incomparably less, than that resulting from agents which, in any quantity, disturb or pervert instead of increasing the healthy activity of the functions. And this *a priori* view, is fully borne out, by what we know of the condition of the blood in the phlegmasiæ, which consists, as we have seen, in augmented and not deteriorated development of the most important element, fibrine, which being effused blends itself with the tissues, adheres to them by a vital affinity, and does injury only by its mechanical properties; while it performs a function in the reproduction of injured or lost parts, which is indispensable, and which, from its deficiency or deterioration, in many other forms of fever, it executes imperfectly or not at all.

These general views may serve as an introduction to the study of the phlegmasiæ. It is not advisable, however, to enter at once on particular

forms, as they have many common characteristics, and may, to a certain point, be studied in the concrete.

SECTION II.

CLASSIFICATION.

WHATEVER may be the difficulty in classing most of the fevers we have studied by a primary anatomical seat, those of the present group present none,—cannot, indeed, be classed in any other way. They who have been most intent on bringing all fevers under the law by which the phlegmasiæ are classified, have attached an importance to the inquiry, which has not, I think, been shown. If it *should*, finally, be demonstrated that they respectively spring from the primary inflammation, the seats of which would, of course, be known, the discovery would not make them phlegmasiæ—would not fuse the whole into one natural group; for the same differences of inflammatory and febrile type, which are now recognized, would still exist; the power which etiology exercises over febrile pathology would remain, and make itself respected by the practical physician.

If we look at the phlegmasiæ by the light of the fever, we see, as it were, but one, while viewed through their causes, we have numberless ill-defined species, and we are, therefore, led to the seat of the inflammation, and instructed to rest our classification on an anatomical basis. In doing this, however, we meet with some difficulties. If guided by general anatomy, we derive a specific character from the tissue affected, and speak of serous, mucous, or fibrous inflammation, we should join together arachnitis and peritonitis, or unite pharyngitis, colitis, and bronchitis, either of which would be absurd. We must, therefore, derive a specific character from an organ, and construct varieties on the basis of the tissues which compose it; but in doing this, we may, with as much propriety, speak of genera and species, as of species and varieties. This method is that generally adopted, and upon it I have constructed the following systematic and comprehensive catalogue.

This method, however, is not applicable to those phlegmasiæ which depend on special causes, and in the present state of our knowledge, must receive an etiological, instead of an anatomical classification. In what has yet been said they have not been taken into account, as their introduction would have interfered with that harmonious coalescence which it is my aim to show is a reality, as long as we include only the effects of ordinary causes. In the tabular view, those which depend on extraordinary or special causes are there presented in a supplementary form.

A. SIMPLE AND COMMON INFLAMMATIONS.

I. Of the Cephalic and Spinal Organs:

Cerebritis,	Arachnitis tuberculosa,
Piamatritis,	Duramatritis,
Arachnitis simplex,	Myelitis.

II. Inflammations of the Organs of Special Sensation:

Retinitis,	Conjunctivitis,
Iritis,	Otitis.

III. Inflammation of the Organs of Locomotion:

Myitis, Neuritis,	Rheumatismus,
Periostitis, Arthritis,	Podagra.

IV. Of the Organs of Respiration:

Catarrh, Influenza,	Pneumonitis,
Laryngitis,	Pleuritis,
Tracheitis,	Diaphragmitis,
Bronchitis,	Pneumonitis tuberculosa?

V. Of the Organs of Circulation:

Pericarditis,	Arteritis,
Carditis,	Phlebitis.
Endocarditis,	

VI. Of the Digestive Organs:

Glossitis,	Colitis.
Stomatitis,	Architis,
Tonsillitis, Parotitis,	Hepatitis,
Pharyngitis,	Splenitis,
Gastritis,	Peritonitis.
Ileitis,	

VII. Of the Urinary and Reproductive Organs:

Nephritis,	Orchitis,
Cystitis,	Metritis,
Urethritis,	Peritonitis puerperalis.

VIII. Of the Cellular Tissue and Skin:

Phlegmon,	Mechanical injuries.
Burns and Scalds,	

B. PECULIAR OR SPECIFIC INFLAMMATIONS.

1. From Mineral Poisons.
2. From Vegetable Poisons.
3. From Animal Poisons.
   a. From Normal Secretions.
   b. From Abnormal Secretions, viz.:

Malignant Pustule,	Syphilis.
Glanders,	Gonorrhœa.

   c. From Decomposing Animal Substances; Dissection Wound.

A glance at this catalogue is sufficient to show that it includes a great number of the most formidable diseases we are called to encounter; some of which present serious difficulties in diagnosis, and a greater number demand

much skill and energy exerted at an early period for their subdual. It would be for a systematic treatise on pathology and practice to include the whole; but the plan of this work makes no such requirement, and even forbids it, for many of them are scarcely met with among us, and others have no claim to be admitted among the principal diseases of the Interior Valley. Regarding the whole, however, as partaking largely of a common constitution and local diathesis, it will be profitable, while studying a part, to have a list of the whole before us. What proportion will receive a further notice, I cannot now decide, but intend to omit all of which I have not seen enough to be qualified to appreciate what has been said of them by others; and by observing this rule, those which but seldom occur among us will of course be excluded. We shall now proceed to the study of the etiology, pathology, and practice, common to the whole class, and then by analysis take up its subordinate divisions.

CHAPTER II.

ETIOLOGY OF THE PHLOGISTIC FEVERS—PREDISPOSING AND MODIFYING CAUSES—INTRODUCTION.

THE object of this chapter, is not to anticipate what must necessarily be said of the production of particular phlegmasiæ, but to consider in a general way the production of inflammation, *per se*, and of an inflammatory diathesis, by the agencies and influences which act upon the people of the Interior Valley. Thus, it will embrace both hygiene and prophylaxis, while it will leave but little to be said on the etiology of those inflammations which may be specifically studied.

SECTION I.

TEMPERAMENT, INDIVIDUAL AND NATIONAL—AGE—SEX.

I. TEMPERAMENT.—As temperaments are transmissible, and our Interior Valley presents an unceasing intermarriage of families and nations,* a well-marked specimen of those which the physiologists have made out is not very often seen.

In the absence of statistics on a subject which scarcely admits of their being collected, I may professionally express the opinion, that the lymphatic and nervous temperaments give the least predisposition to the phlegmasiæ, and may sometimes even prevent them under the action of causes which, in a different temperament, might produce them. In those temperaments local

* See Book I. Part iii. Chap. i. Vol. I. p. 637.

I. Of the Cephalic
Cerebrit
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the place of inflammation and fever-
ations do arise, although they may not
different temperament, they are danger-
soon exhausted by the combined influence
plications required or supposed to be required
es which most predispose to the phlogistic
bilious. To which the greater influence
repared to say. The sanguine is sometimes
power by an infusion of the lymphatic; and
educed by the nervous. At other times we find
rson, giving us a bilio-sanguineous temperament,
oth frequency of occurrence, and intensity of
e. Left to themselves, patients of this tempera-
han those which have the lymphatic or the ner-
ided antiphlogistic treatment much better, and
triumphs of the profession.

of the human race found in our Valley, the tem-
an most favors the production of phlogistic fevers.
and Indian do not, however, preclude such fevers, but
and diminish their intensity; this is not the place to
dies of these races. Of our Caucasian population, the
n English, Irish, Scotch, and German progenitors, are I
as to the fevers we are considering, and next to them
om those countries. The national temperament of the
e, tempered by the bilious, phlegmatic, or nervous.
Mexican population, resident within the southern basin,
confidence. Such as I have seen appeared to have the
; but I am not aware that they are prone to the phlegma-
their simple habits and vegetable diet may perhaps be a

t temperament of the French *Creoles* of Louisiana, and
Canada, living on the St. Lawrence and its tributaries, is
inquiries lead me to the conclusion, that the former are
phlogistic fevers than the descendants of other European
same region; but something must be allowed for their more
stless modes of living. They are certainly less subject to
their brethren in the North, who eat large quantities of
experience the rigors of a higher latitude; but whether
as much predisposed to the phlogistic fevers, as their neigh-
sh, Scotch, and Irish parentage, the facts I have collected do
to decide.

It is generally, and I think, correctly admitted, that infancy
are periods of great comparative mortality in most parts of
How large a proportion of the deaths are caused by the phlegma-

siæ is unknown. It is quite certain that many young children die of convulsions, occasioned by irritations which would develop inflammation if death did not take place so soon. Many die of cholera infantum, diarrhœa, and dysentery, which may or may not be attended with mucous inflammation. Many die of measles, and a much larger number of scarlatina. But in comparison with these and other less fruitful sources of mortality, we may I think place the phlegmasiæ, and pronounce them more than equal to all other causes of mortality. Those of the respiratory organs, especially the mucous membranes, are most frequent; next come the inflammations of the brain, simple and tubercular, and lastly of the mucous membrane of the stomach and bowels, and the ganglia of the mesentery. The skin, the eye and the ear, are likewise the frequent seats of inflammation; and it may be especially noted that those of the latter organ, occur oftener in the first few years, than in the whole of after-life. It appears from these facts that the great development of the arterial system, the highly arterialized state of the blood, and the lively sensibility and contractility of infancy and childhood, strongly predispose to the phlogistic fevers. At a more advanced stage of the ante-pubertal period, some of those phlegmasiæ become less frequent, but those of the fibrous tissues, under the names of articular rheumatism and carditis, take their place. After puberty the predisposition is less, but continues throughout the period of active life with but little reduction; yet the inflammations to some extent change their seat from the head and chest to the abdomen and pelvis. In the old age of the male, they oftener fix on the urinary organs than at an earlier period. At this advanced time of life, when the venous circulation predominates as it were over the arterial, and the vital properties of the solids have lost a portion of their activity, there is on the whole a diminished predisposition to the phlegmasiæ, but when they do occur, they are more fatal, though less intense.

III. Sex.—From infancy to puberty, our male and female children have appeared to me equally subject to the phlegmasiæ. After the physiological epoch, which develops the peculiarities of sex, the male becomes more predisposed than the female, a result, perhaps of the predominance of the sanguineo-bilious temperament in one, of the nervo-lymphatic in the other sex. But much of the comparative liability of the sexes is indirect or incidental. Thus the function of child-bearing in women, leads to the more frequent development of inflammation in the pelvic and lower abdominal organs, while the out-door labors and exposures, from which, to the honor of man in this country, woman is so shielded, excite in him many inflammations, from which she remains comparatively exempt, though it must be confessed, that no small portion of her exemption is referrible to an avoidance of those intemperate indulgences, which man mixes up with his exposures. From the difference in physiology, moreover, many causes which produce inflammation in men, excite only nervous irritations in women. As might be expected, this difference is a modifying influence, which must be taken into account

in the treatment of the phlegmasiæ of the two sexes; the copious depletions, decisive contra-stimulations, and unrelenting efforts at translation or metastasis of morbid action, to which male patients are so often subjected, being generally inadmissible in the treatment of the other sex.

SECTION II.

CLIMATE.

I. THE southern or Mexican hydrographical basin* extends many degrees into the torrid zone, and thus gives us a tropical climate.† Yet the close approximation of the high mountains or Cordilleras, to the Gulf of Mexico, subjects the inhabitants of the narrow tierras calientes, and the seamen of the Gulf, to depressions of temperature, which do not properly belong to a tropical climate. My personal observations have not extended into the torrid zone, but from what I have been able to learn in other modes, a high and sustained temperature does not produce or even predispose to the phlegmasiæ generally. Of the whole, hepatitis occurs most frequently; is perhaps the most legitimate offspring of regular long-continued heat. Pneumonia and rheumatism are, however, not unfrequent, but they may be regarded as the offspring of the northers,‡ which at certain seasons sweep over the Gulf and inhabited coasts, rather than the elevated mean temperature. The seamen of the Gulf, and the people who reside on its shores, live in an atmosphere almost saturated with vapor, as the complement of the dew-point is always exceedingly limited, while the mean temperature of the year is high; but from the small number of phlegmasiæ we may infer that this quality of the air does not itself contribute to their production.

II. Let us now pass from the torrid to the frigid zone, from a steady high to an equally steady low temperature, such as we find in the Arctic hydrographical basin.§ We have here within the polar circle a mean temperature of but two degrees, or seventy-eight below that within the tropics,‖ with a corresponding reduction of the proportion of atmospheric vapor.¶ Now, on the authority of the eminent travellers and navigators** who visited and sojourned in those frigid and dreary regions, it may be stated, that the Esquimaux, their indigenous inhabitants, are a robust and healthy race: but what is more reliable and pertinent to our present inquiry, that the European and American seamen who spent from one to four years, exposed to the rigors of that climate, were less affected with the phlegmasiæ than in their native countries. Thus it appears that great reduction of temperature, if steadily maintained, in other words, that extreme and steady cold favors the production of inflammation and phlogistic fever even less than high and

* See vol. i. pp. 29, 42, and 46. † Ibid. p. 455. ‡ Ibid. pp. 582, 609.
§ Ibid. p. 442. ‖ Ibid. p. 459. ¶ Ibid. pp. 602, 606. ** Ibid. p. 457.

uniform heat. We must now turn to the climates which connect these extremes.

III. The mean heat of our Interior Valley is about fifty degrees,* and the isothermal curve of that temperature lies near the southern side of the great lakes, between the forty-first and forty-second degrees of latitude. From the south, as we rise towards this line, the mean temperature decreases, but the variations increase; from the north as we descend to it, the mean heat increases, and the variations likewise. In a certain sense we may say then that the curve of mean annual temperature is that of maximum variation; as the extremes of mean temperature present us with the minima of variation. Finally, as these variations of heat bring with them variations of moisture and barometric pressure, we perceive at once the difference between the climates of our temperate zone, and those which limit it to the south and north.

Now what is the relation between these variable climates and our phlegmasiæ? The answer is that of cause and effect; for observation teaches us that the latter multiply in number, diversity, acuteness, and mortality, with the increase of the former, whether we examine them in different latitudes or study their prevalence in connection with the steady temperatures of midsummer and midwinter, compared with the variable weather of the other periods of the year. Both the high heat of summer and the low heat of winter seem, however, to predispose the system to those inflammations, or at least increase the noxious influence of the sudden depressions of autumn and the equally sudden elevations of early spring, when on the whole the phlegmasiæ dependent on climate are most prevalent.

Having recognized a cause of the phlegmasiæ, let us inquire into its *modus operandi*. The enfeebling influence of extreme cold and extreme heat may be taken as an established fact. Another, equally admitted and pertinent to our inquiry, is that additions or subtractions of heat produce on organized bodies effects so much the greater as they have been immediately before exposed to the opposite temperature. The painful sensation in the hand which is plunged in to snow after having been held in hot water, the destructive influence of a high temperature on one who has been frozen, the rapid progress of returning vegetation after a hard winter, are evidences of a law which the experience of the world has recognized. We have then in variation of atmospheric temperature a stimulant of great and universal power, to which in the temperate zone we are perpetually exposed. Its action in the production of the phlegmasiæ is both predisposing and exciting; thus constituting it a productive cause. As a predisposing agent it exalts the vital properties, augments tonicity, quickens the capillary circulation, augments the activity of the functions, and thus creates what for want of a better mode of expression, I shall venture to call a physiological inflammatory diathesis, or a phlogistic temperament, such as characterizes the inha-

* Ibid. p. 530.

bitants of the temperate zones, as compared with those of the torrid and the frigid. This, to speak figuratively, is the soil in which implanted exciting causes bring forth the phlegmasiæ. These causes are various, but one of them is the same variation of temperature which generated the predisposition. Hence a sudden change of weather will excite in a person having this predisposition an acute inflammation, while, in others not having it the result will be a relapse of intermittent fever, a paroxysm of dyspepsia, or a fit of flatulent colic. The manner in which all this is brought about may not be very obvious; but in general the equilibrium of the circulation is disturbed, and the viscera become engorged; when, if the vital powers should be energetic and active, inflammation will be set up, if not, there will be only the disturbances of innervation and secretion which characterize the other forms of disease.

Sudden variations of heat and moisture may, however, produce the phlegmasia in those who have no predisposition to them, but are, so to speak, in the opposite condition. Such is their effect on the long secluded, on the badly fed, on the ailing or infirm, whose conditions may in fact be regarded as predispositions to the phlegmasiæ, which in such systems are more intractable and fatal than in sound and vigorous constitutions.

The conclusions at which we have arrived show us a striking connection between the sustainers and destroyers of life by inflammation. It is in the temperate zone that man reaches his highest physical, intellectual, moral, and social development, and in the same zone his inflammations are most multiplied and fatal. Neither effect depends merely on the direct influence of the climate, yet much of both should be referred to that head; while as much more might perhaps be traced up to climatic influences indirectly exerted.

SECTION III.

DIET, DRINKS, AND DRESS.

I. DIET.—It may be assumed that when the body is adequately, properly nourished with wholesome animal and vegetable food, it has its best protection against the phlegmasiæ of the variable climates. If the inhabitants of the torrid zone, who live chiefly on vegetable diet, suffer but little from those fevers, we need not ascribe their exemption to their diet, because the climatic influences are absent. Yet, for *them*, a vegetable diet is doubtless the best, and should the animal food, appropriate to the colder climates, be adopted by them, it is probable that the number of their phlegmasiæ would increase. In like manner, the fatty animal food of the Esquimaux of our distant North is, no doubt, the best for them, as contributing more than any other to fortify them against the rigors of their climate; yet, as the influences of atmospheric variation are little felt by them, we cannot know

how much of their exemption arises from a diet which contains but a small proportion of the protein elements of the body.

If, in the temperate climates, a supply of diversified aliment, sufficient to meet the physiological demands of the system, constitutes, as far as diet is concerned, the best protection against the phlegmasiæ, it seems to follow that any great departure either towards deficiency or excess may favor the production of those maladies. Let us first consider the former.

It is certainly not true that a habitual reduction below what may be called the normal standard, is necessarily productive of a predisposition to the phlegmasiæ; for it is well known that the trappers and voyageurs on the distant plains, rivers, and lakes, in the northwestern portions of the Valley, who eat much less than when at home, enjoy a great immunity from inflammations, though signally exposed to inclement weather. A gentleman,* who had been engaged in the fur trade, informed me that he once spent a winter at Sandy Lake, west of Lake Superior, during which the voyageurs, who were idle, ate heartily of wild meats, and became the subjects of pulmonary inflammation to an uncommon degree, showing that their ordinary food had previously contributed to counteract the effects of climate. Finally, it is well known that journeys to Santa Fé and the Rocky Mountains, attended, as they of necessity are, with reduction of diet, often cure subacute inflammations; as a similar reduction, honestly made by our patients, is known to do in the practice of medicine. It does not follow, however, that what is curative would have been preventive; nevertheless, we are instructed by these facts to believe that a reduction of diet, which gives a predisposition to the phlegmasiæ, must be one which impairs the energies of the system, and affects the natural density of the tissues, and renders them irritable. In such a *quasi* pathological condition, exciting causes readily awaken inflammations, often chronic, but sometimes acute, which are dangerous, and difficult to cure in proportion to the previous degradation of the system. In looking beyond this degree of abstinence, we find that actual famine may become a *producing* cause of inflammation, and both gastritis and cerebritis have been found to arise before death from starvation. That these reactions of concentration do not occur in every case of total abstinence, we may well believe, from knowing that some systems sink under enfeebling influences, against which others rally, though the revived excitement may be neither healthy nor enduring. Such organisms may be said to die fighting.

By a reference to the article DIET,† it will be seen that deficient food, except in individual cases, is not a predisposing cause of the phlegmasiæ of our Valley, where, on the whole, the tendency is to excess, and to that subject we must now direct our attention.

A full, stimulating, and nutritious diet, is the most powerful and permanent stimulus which our systems enjoy. It affects pleasantly the whole

* Mr. W. Johnson, of Mackinac. † Vol. i. p. 653.

innervation, augments the volume, especially the protein elements, of the blood, and affords frequent and profuse supplies of nutriment to the tissues. Exerting its first and most exciting influence on the stomach, it constitutes that and the other abdominal organs a centre of copious fluxion, and the blood thus brought thither still further exalts the vital properties of that portion of the organism whence the augmented excitement is radiated throughout the whole. Thus, the heart is quickened in the force and frequency of its contractions, and the brain is either roused into unwonted activity of function, or oppressed by plethora and irregularity of circulation, inducing heaviness or sleep.

It is undeniable that such a condition predisposes to the phlegmasiæ, though, it may be, not to them only. That pathological state may even supervene without the agency of an exciting cause, but more certainly under its influence, although it might be of such feeble disturbing power, that in a lower grade of constitutional excitement, its action would be harmless. When inflammation is thus gotten up, its seat is sometimes settled by the previous infirmity of an organ, sometimes by the part having been most stimulated and oftenest brought into a state of physiological hyperæmia, at other times, and, perhaps, most frequently, by the specific direction in the organism, which the exciting cause may take. In our Interior Valley, the fibrous and ligamentous tissues often suffer with rheumatism; and the brain, or its membranes, are frequently assailed; but the organs most often and fatally involved, are the abdominal, which are thus compelled to make retribution for violations of their physiological laws by suffering from acute dyspepsia, or actual gastritis; from duodenitis with the *soubriquet* of bilious colic; from ileitis, peritonitis, and hepatitis, all of which may arise even independently of any exciting cause, except, perhaps, that of an occasional excess in eating; or may follow on the application of an agent, which, without this predisposition, would be harmless.

II. Drinks.—Tea and coffee so universally drunk by our people,* neither excite inflammation nor contribute directly to the production of a phlogistic diathesis. They disorder the innervation, however, and often establish in the stomach a morbid sensibility, and thus indirectly favor the production of subacute gastritis, rendering the differential diagnosis of the chronic affections of that organ somewhat difficult.

Alcoholic drinks are undoubtedly more productive of inflammation. Of wines, much of the Sherry and Madeira drunk in the Valley is factitious and highly alcoholized, yet their consumption on the whole is not so great as to entitle them to much attention under this head.† The claret of the South containing much acid and but little alcohol; and the pure and weak wine made from our own vineyards,‡ and known under the name of Catawba, cannot be classed with the causes of the phlegmasiæ. Most of our ales, porters, beers, and ciders, contain but little alcohol; yet as they include a

* See vol. i. p. 65s. † Ibid. p. 668. ‡ Ibid. p. 669.

considerable amount of nutritive matter, and are often drunk in large quantities, they co-operate with a full diet in generating a phlogistic diathesis. Of ardent spirits a liberal quantity is consumed under the names of brandy and whiskey; and what shall be said of them? The answer is that a drunken debauch is often the exciting cause of an inflammation; and that they are still oftener the producing cause not only of a phlogistic diathesis, but of actual subacute inflammation of the mucous membrane of the stomach and bowels, of the liver, the eyes, and the brain. Thus intemperance combines with gluttony in lighting up inflammation, or in preparing the system for the torch of some exciting cause. Every part of the Valley affords evidence of this fact among its native population; and in reference to immigrants I may state, that, when in Chicago, in 1844, I was informed by Professor Brainerd, that many of the Norwegians who enter the West by that city, die from inflammatory fevers, generated by excessive indulgence in meat and whiskey.

III. Dress.—In the variable climates of our Valley, change of dress is required, but the change seldom keeps pace with the necessity. From ignorance or neglect, in numerous instances the modification of apparel is not made till the variation of temperature has arrested its pernicious influence. In autumn, a resort to warmer clothes is deferred too long; in spring they are thrown off too soon. Children are sometimes reared in such seclusion from the elements, that accidental exposures become the cause of inflammation; and many grown persons protect themselves so carefully as to be subject to attacks of that kind from the least exposure. Others lodge in close and heated rooms, whereby they are rendered incapable of exposing themselves to inclemencies of weather, without the risk of an inflammation; and others still, when plunging into fashionable amusements, forget all discretion and consistency in dress, and thus have serious inflammatory affections awakened in their systems. These causes of phlogistic fever, prevail both in town and country, but more in the former, where many females adopt fashions, which act as predisposing or exciting causes of inflammation in certain organs.

Thus, corseting carried to excess, prevents the *normal* growth of the chest, compresses the lungs and heart, and predisposes them to inflammation; or, so squeezes the stomach between the liver and spleen, as to irritate it into chronic gastritis; while, by pushing the bowels upon the uterine system it sinks the latter low in the pelvis, and lays a foundation for future inflammations.

SECTION IV.

OCCUPATIONS—CASUALTIES—MENTAL CULTIVATION—PASSIONS.

I. Occupations and Casualties.—Many branches of industry contribute to the production of the group of diseases we are now considering.

ry employments with a full diet favor the production of inflamma- the brain and abdominal viscera. Constrained positions generate hypertrophies, often accompanied with inflammation and fever. The sive or improper use of the eyes gives rise to ophthalmia. Great mus- xertion predisposes to lumbago and articular rheumatism. The a l breathing of an atmosphere mechanically impure, produces sub- ute bronchitis; while the accidental inhalation of acrid gases in manufac- establishments, causes the same disease in its acute forms; the in- n of acrid poisons originates gastritis; burns and scalds inflame the and sometimes raise secondary inflammation in the lungs. The whole e remote causes are daily becoming more frequent, as the occupations y become more diversified. Burns and scalds especially are greatly ncrease in every part of the country, the causes of which may be referred to the following heads:

1. The invention of certain inflammable terebinthinate alcoholic tinctures as a substitute for candles and lamps, the use of which has already destroyed many lives, and ought, by law, to be prohibited. 2. The universal substitution of cotton for woollen fabrics in the exterior winter garments of females, which have destroyed a still greater number. 3. The multiplication of steam-engines in mills, factories, and boats, where from explosions great numbers are annually scalded.

Mechanical violence, such as contusions, fractures, dislocations, and wounds, have always been and still are common causes of inflammation among us. The clearing of forest land, and the erection of the houses have been unavoidably attended with numerous accidents, producing inflammation in various parts of the body. In many parts of our country these labors are still in active progress. In others they are succeeded by a new and equally prolific source of casualties. I refer to steamboats, which have multiplied on our waters till they afford employment to thousands of operatives, under the name of firemen and deck hands, who are more obnoxious to injuries of this kind than any other class of persons.

In the early settlement of the country, the border warfare with the Indians led to many gunshot wounds; while the warlike spirit which external dangers nourished, assumed the character of pugnacity, and led the hardy and fearless backwoodsmen to turn upon each other. Both casual and pitched battles were common events; but the state of society was so primitive, that the instruments of mischief were generally the hands and teeth. A pommelling with the first, sufficient to give two or more cases of inflammation and fever, was a frequent result; and the injury and loss of an eye, followed by the same consequences, was equally common; while severe bites on the face and hands now and then gave poisoned wounds, which healed with difficulty. The secretion of an acrid saliva under the influence of rage, is an effect, which finds its parallel in the carnivorous animals, and cannot, therefore, be rejected as visionary. With the progress of society this pug-

nacity has signally abated; yet enough remains to render it formidable to life, for the pistol and the bowie knife, have in many parts of the Valley supplanted the teeth and fist.

The common-place character of the little items of this section, should not be regarded as sinking them below the dignity of etiological history, which has for its province all causes of disease and death. These are ever varying, with variations in the physical and social condition of a country; and without a reference to them, the science of vital statistics becomes but a dry assemblage of generalities, inapplicable to any particular time or place, and therefore barren of the fruits which society expects from its cultivation. As to those with which the section closes, I must be permitted to say, that science demands every fact, and historic truth tolerates no suppression.

II. Mental Exercise and Excited Passion.—Excess of mental labor is a predisposing if not a producing cause of inflammatory disease. The first corporeal effect of mental labor, falls on the brain, the seat and organ of thought. From over action of the mind, the cerebral substance is unfavorably affected; and an increased quantity of blood comes to occupy its vessels, which do not always send it forward within the proper time.

Under the predisposition thus induced, very slight exciting causes may awaken an inflammation of that organ, especially in young subjects. This cause is more prevalent in the cities than in the country, for the reason that hard study is more common in the former than in the latter. For a similar reason, the eyes of students are liable to inflammation. The retina is rendered morbidly sensitive by protracted application, especially at night; blood is invited into it, and not into it only, but, as the tissues of the organ sympathize with each other, any one or several of them may become the seat of congestion and inflammation.

This does not depend wholly on the use of the eyes, but in part, on the frequently induced engorgement of the brain, and is therefore analogous to, or identical with, the congestion of the eyes, which attends inflammatory affections of the brain in certain forms of fever, or in cerebritis from common causes. In latter years it has, in this country, become fashionable to multiply the studies of children, who, allowed to eat freely, and not required to take due exercise, are expected to accomplish their scholastic education in half the time which should be devoted to a plan of studies so diversified. To say nothing of sinister effects which do not fall under this head, we may safely affirm that many children become the victims of this discipline, through the simple or scrofulous inflammatory affections of the brain which are thus awakened. At the period of adolescence, a chronic irritation of that organ thus induced, sometimes raises in the stomach an inflammatory condition, with a train of dyspeptic infirmities.

Excited passions and deep emotions exert an influence on the brain, and disturb its circulation. Strong excitation of this kind is more common in the southern than the northern portions of our Valley, in the slaveholding than

the non-slaveholding states—but the people of the latter are by no means exempt from this cause of cerebral irritation; for wherever there is density of population, with freedom of action, there will be variety of pursuits, conflicts of interest, complexity of business, and excited avarice or ambition; there must, of necessity, be deep and agitating paroxysms of passion, which may awaken cerebral inflammation in the predisposed, while protracted anxieties, jealousies, and mortifications may create a tendency to the same disease.

III. From this brief, yet comprehensive etiological survey, we perceive that the causes which directly, indirectly, or remotely originate the group of diseases now under consideration, are immensely numerous and diversified; that they abound most in the temperate zone, man's favorite abode; and connect themselves inseparably with his civilization, but for which many of them would not have come into existence; finally, that however various and opposite in constitution and character, they concur in the production of a common effect, a single type of disease, inflammation and phlogistic fever. By living in cities we escape intermittent fever; yellow fever does not pursue us into the country; capacious and well-aired apartments, cleanliness and a generous diet, will nearly protect us from typhous fevers; vaccination will defend us against small-pox, and the other eruptive fevers cannot assail us a second time; but the causes which generate the phlogistic fevers, abound in both city and country; if some be destroyed, others arise; they increase with the density of population; they beset us on every side; combine together in their action, and generally leave us more liable to a second than we were to the first attack. To the physician, philanthropist, and social philosopher, these causes, and the fevers they originate, are, therefore, of deep and enduring interest; for they are checks to the civilization, of which many of them are the fruits, and he who may obviate any portion of them, will, indirectly, give an impulse to the progress and happiness of society.

SECTION V.

PATHOLOGICAL AND MODIFYING CAUSES.

I. Pathological Causes.—The inflammations which may be referred to this head, are not those which make a necessary part of any other disease, but such as are produced by it contingently, or occur from its giving efficiency to exciting causes, that acting on the system during its existence produce effects which they might not have produced at other times. It is not necessary to make an enumeration of all cases of this kind, and I shall limit it to a part of what have occurred under my own observation.

Inflammation of the brain is sometimes excited by pertussis, which in other cases produces bronchitis and even pneumonia; measles may generate pleurisy, followed by empyema; active hypertrophy of the left ventricle of the

heart may generate cerebritis—of the right, pulmonary inflammation; deposits of tubercular matter which may occur without inflammation, invariably excite it; a stone in the bladder may originate cystitis; a retention of urine from stricture of the urethra, may lead to rupture of the bladder, followed by a fatal peritonitis; an abscess of the liver, pouring its contents into the cavity of the peritoneum, will produce the same effect, which may also be brought about by ulcerative action, perforating the neck of the gall-bladder, the stomach, or the bowels, and permitting an escape of their contents; suppuration, or rupture of the spleen from softening will do the same; a morbid peristaltic function of the intestines, forming invaginations or snarls, may bring about the same result; splenitis, hepatitis, or mucous inflammation of the bowels, may follow on periodical fever; and subcutaneous abscesses on those of a continued type. Finally, all long-continued derangements of function; all serious enfeeblement of the nervous system; every deep and protracted impoverishment of the blood, may at last, under the influence of exciting causes, or from an inherent tendency in the system to reaction, be followed by inflammation.

II. Modifying Causes.—While all the phlegmasiæ consist of inflammation and fever from common or non-specific causes, they present many modifications which demand attention, and justify the classifications of nosology. The modifying influences may be referred to three different heads: 1. *External or Material;* 2. *Anatomico-Physiological;* 3. *Pathological.*

1. *External or Material.*—Although, as I have said, the phlogistic fevers do not arise from specific but common causes, we must not group the whole, and declare them so identical in their nature and effects as to be, in reality, but one. Some of their causes awaken an immediate and violent inflammation, as great vicissitudes of temperature; others can only establish an inflammation slowly, as alcoholic drinks and gluttony. Others again, as a burn or scald, raise a fever that is less acute, than that which follows on a mechanical injury. But the diversities from this source are less striking than the diversities which are presented by the fevers which arise from specific causes, such as measles and scarlatina.

2. *Anatomico-Physiological.*—The modifying influences referable to this head, are much greater than the last. Every tissue or organ possessing, as it does, a structure, *sui generis*, not only modifies to some extent the inflammation which may be established in it, but, when inflamed, affects the general system in a manner peculiar to itself, though it may not always be possible to appreciate the diversity. Inflammations of the osseous and cartilaginous structures raise but little fever, and awaken but few sympathies; dermoid and mucous inflammations are attended with more pain, spread a more distressing sympathy through the organism generally, and develop an acuter state of fever; inflammations of the fibrous tissue are generally attended with a higher degree of pain and fever, as in acute rheumatism, gout, and injuries of the joints from external violence; but

it is when the inflammation attacks a serous or cellular membrane that we have the severest suffering in the affected part, and the highest toned phlogistic action of the general system. Thus peritonitis, pleuritis, and arachnitis, present us with symptoms of great intensity. As a general fact, when the inflammation is seated in the investing membranes of the organ, it manifests more acuteness, and the accompanying fever has a more open phlogistic character, than when it is seated in their parenchyma. This is true of hepatic, splenic, pulmonary, and cerebral inflammations. Again, the specific or peculiar influence of an organ over the rest, modifies the character of the fever connected with its inflammation. When seated in the liver, the general symptoms are not the same as when seated in the spleen, nor are they the same in an inflammation of the parenchyma of the lungs, as in the substance of the brain. In short, it may be said, that while all phlogistic fevers are, in one sense, the very same diseases, let the inflammation be seated in whatever tissue or organ it may, both it and the accompanying fever are modified by the structure, vital properties, and functions of the part inflamed.

The influence of temperament on the character of inflammation and phlogistic fever may be inferred from what has been already said under the head of predisposing causes. The temperament which most predisposes, will, of course, sustain the acutest inflammation, *et vice versa*.

3. *Pathological.*—The previous condition of both the general system and of the inflamed organ modifies the disease. If the structure be already morbid, the inflammation is apt to assume an uncontrollable and destructive character, although it may not rouse as much fever as if the organ had been sound; for the sympathies of the general system are more lively with healthy parts when inflamed than with such as have their vital properties impaired. Thus, the fever connected with pneumonia or pleurisy, in one of sound lungs, is more phlogistic than in one whose lungs are tuberculous, though the disorganization from the inflammation may be more rapid in the former than the latter case. The diversities we are now considering, do not, however, spring entirely from the previous state of the affected organ; but still more, perhaps, from the pathological state of the general system before the fever commenced. Thus, when the lungs are tuberculous, there is, at the same time, such a constitutional distemperature as prevents the development of an acute fever; when the individual, previous to the attack, was scorbutic or chlorotic, whatever the part attacked, the phlogistic symptoms cannot rise high; if the patient had been for some time exposed to a malarious atmosphere, the fever, instead of being sustained, may assume so much of an intermittent character, as to preclude the use of the lancet; if a typhous constitution had been for some time prevalent, that which began as a pure phlogistic disease may speedily become typhoid; finally, if jaundice had existed for a while, and an inflammation then supervened in the liver or lungs, a state of constitutional irritation is soon developed by copious bleeding. Other ex-

amples might be given, but these citations will be sufficient to illustrate this important and interesting pathological source of the diversities which the same phlogistic fevers present to us in practice.

SECTION VI.

CAUSES WHICH PRODUCE SPECIFIC PHLEGMASIÆ.

I. Thus far this chapter has been devoted to the etiology of those simple, every-day inflammations, generally known under the name of phlegmasiæ, which results from the excessive, defective, or misdirected action of the agents which support life, which establish a phlogistic diathesis, local and constitutional, *nearly* of the same kind, when the affected tissue is the same, which generate the same lesions of structure, and are subdued by one method of treatment—the antiphlogistic. I have called them common, because, with some undefinable exceptions, one type represents the whole, and the causes which produce them are not only familiar objects, but agree in their normal actions on our systems, as the necessary means of life and health.

But there are primary inflammations with fever which do not result from any of the causes that have been enumerated, which differ widely from each other, and from those of which we have spoken, that, respectively, never arise but from the same cause, and which are but partially amenable to the antiphlogistic treatment. To these we may give as the family name, specific or particular.

The gash of a smooth and polished knife is followed by a common inflammation; but if the instrument be smeared with a morbific poison, the inflammation will be peculiar or specific, and the respective constitutional affections will, in like manner, differ from each other. Here, then, we have representations of the two groups, and some of the causes of the latter group are to be enumerated in this section. They may be divided into mineral, vegetable, and animal.

II. When arsenic, iodine, and corrosive sublimate are so administered as to excite subacute gastritis with fever, we have three different groups of diagnostic symptoms each characteristic of its cause. When these agents are taken in large doses, so as produce a sudden and rapidly fatal inflammation, the common symptoms so far prevail over the peculiar as to obscure or mask them, and hence our practice is to class the mineral poisons with the causes of the simple phlegmasiæ detailed in the preceding sections, which, from what has just been said, is obviously wrong. The agents which have been named may be taken as specimens of what the inorganic kingdom affords, and every reader can augment the number for himself.

III. The pungent, acrid, and narcotico-acrid vegetable poisons, concur in exciting inflammation in the part to which they are adequately applied,

together with fever in the general system. The pathological states produced by some of them differ but little from those excited by what we have called common causes, but others produce effects of a peculiar kind. Now the former, such as capsicum, black pepper, oil of cinnamon, and other spices, are mingled with our food, but *why* are they selected for that purpose? It must be because they make an impression on our vital susceptibilities that is both pleasant and salutary.* They constitute the stimulating element of our food, and are helps to the sustainers of life. Thus the excitement they raise has a fellowship with that created by bread and meat; and it therefore follows that when they are accidentally introduced into our stomachs in large quantities, they raise an inflammation identical with or very like that raised by an abuse of diet, or by any other of those which have been called every-day causes.

When, however, we pass from these to other vegetable substances never used as vital sustainers, we find their respective effects peculiar, and that they differ as widely from each other as from the ordinary inflammations. Thus, elaterium, croton oil, euphorbium, and rhus toxicodendron, not to mention others, when applied in an appropriate dose and manner excite phlegmasiæ, each of a special character.

IV. The animal kingdom supplies many causes of specific inflammation. They may be distributed under two heads—normal and abnormal secretions.

1. The cantharidin of the coleopterous tribe, and the poisons instilled into the wounds made by hornets, wasps, bees, musquitoes, gnats, sand-flies, and other insects, are examples drawn from a department of nature, in which supplies of virus are substituted for size and strength in the work of self-preservation; and in passing on to a group of larger animals—the serpents—we find many of the sluggish and helpless furnished with magazines of venom. Now all these normal secretions may cause peculiar inflammations with or without fever; and although etiology has not yet condescended to distinguish one of these phlegmasiæ from another, we have no difficulty in recognizing the whole as differing widely from those which are produced by agents not *malum per se*.

2. We come in the second place to those abnormal or heterologous secretions which are not only morbid in their origin, but morbific in their effects, when applied to our bodies. And here we must be careful to take only those which excite inflammation in the part to which they are applied, and affect the general organism through that part and by such application. Thus limited, we exclude the periodical, continued, eruptive, and all other fevers not known to be *preceded* by inflammation, and out of the residue may cite syphilis, gonorrhœa, contagious ophthalmia, malignant pustule, glanders, and the disease consequent on dissection wounds. Inoculated small-pox and measles cannot be admitted, because those fevers are commu-

* See vol. i. p. 669–70.

nicable in other modes, and hydrophobia must be excluded, because the wound heals up and the subsequent lesions of function (of a doubtful inflammatory character), are first found in distant organs.

The etiology of the phlogistic fevers is now concluded but not completed; and we must take up the study of their pathology.

CHAPTER III.

RISE AND ESTABLISHMENT OF THE SIMPLE OR COMMON PHLEGMASIÆ, AND STATE OF THE BLOOD IN THEM.

SECTION I.

OF THEIR RISE AND ESTABLISHMENT.

I. In the last chapter, on the remote causes of *our* phlegmasiæ, there was something to give a regional* and national character to the discussion; but when we come to an inquiry into their effects, we are thrown upon the facts and doctrines of inflammation and fever, which are the very elements of the science. Yet this is not an elementary treatise, nor would I presume to enter the list with the great pathologists who have brought this department of medicine to its present development. Yet, as all sound therapeutics must have a pathological basis, it is necessary that I should make a brief recognition of such established facts as will throw a reflected, if not a direct and brilliant light on the morbid actions which generate the functional disorders and pathological changes which characterize the phlegmasiæ. In doing this I shall not often stop to trace up to their authors the facts and speculations which I may select out of what has in a manner become the common property of the profession; trusting, after what has been said, that I shall not be charged with intending to present as my own, that which of right belongs to others.

II. The phlegmasiæ consist *essentially* of combined inflammation and fever, the former always arising before or at the same time with the latter. Yet we have inflammations so mild or limited that they do not awaken fever. Now may we at any time have fever *from the causes which have been reviewed*, without the other element, inflammation? I suppose we may, and that many of our ephemeræ are of that kind. An individual after a cold ride, eats but little supper, and drinks freely of any diluent, then retires to bed and falls into a perspiration. Another, after a similar ride, eats a hearty and stimulating meal with but little dilution, lies down

* I hope to be pardoned for forming this adjective. In writing on the diseases of a country so extensive, the words local and topical would be absurd.

t eep but soon finds himself in a state of febrile heat, with thirst, headache, and restlessness. Towards morning these symptoms abate, sleep and sweat come on, and he rises free from fever. A third, who has subjected himself to the same circumstances with the second, may, however, before day find that a pleurisy or an articular rheumatism has arisen with the fever, which does not then leave him. Thus it appears that a febricula or transient fever may be produced by the same causes which generate the perfect phlegmasiæ, but I know of no proofs that a persisting inflammatory fever can exist unaccompanied by inflammation. Without the local affection the constitutional soon dies away.

III. When a cause of inflammation acts upon a part, the immediate effects may be either of two kinds: *first*, if it be applied with moderation, it increases the vital activity of the part, quickens its susceptibilities, and augments its quantity of blood; which phenomena disappear on its ceasing to act; but if it be renewed, or have n ; been thus interrupted, the nervovascular excitement continues to rise; he sensations, at first pleasurable, become painful; a feeling of heat, with an actual increase of animal temperature, supervenes; the hyperæmia causes increased redness and swelling, and the special function of the part is suspended, or rendered morbid. An inflammation is now set up, which may be acute and rapid; but is oftener subacute and chronic, an example of which may be found in common inflammatory dyspepsia, from gluttony, or alcoholic stimulation.

In the production of these phenomena, I recognize the nervous endowment of the capillary vessels as the tissue first affected, but shall not stop to inquire into the comparative probability of the different hypotheses which men of genius have invented to account for vascular repletion under the previously excited innervation. I see in it the operation of the physiological law, under which the different organs, when excited by their appropriate stimuli, come to receive a greater quantity of arterial blood than when they are at rest; but how they acquire it, I do not understand.

The fever which ensues is equally referable to another law of the organism; that which through the nervous system gives to a part the power of modifying the whole. Thus, when the stomach is excited with food and stimulating drink, the brain and heart are quickened in their activity and energy, and thus the whole system is brought into a state of excitement, which strongly contrasts with its condition when that organ has been for some time deprived of aliment. Under this law, when a part becomes inflamed, it raises in the organism a morbid excitement or fever, the intensity of which is generally in proportion to the extent and violence of the inflammation multiplied into, that is, taken in connection with the influence which the organ in its states of healthy excitement exercises over the rest.

IV. But causes do not always act on a part in the manner that has been pointed out. In numerous instances they come with concentrated and violent energy, when, instead of exciting, they directly depress the nervous

force, reduce the amount of blood below the normal quantity, and suspend or greatly impair its special functions. The length of time it may continue in this state of depression will be according to the degree to which it has been carried, and the recuperative powers of the organism. When the former is great and the latter are small, the patient may sink without a supervening inflammation; but under the physiological law of reaction, the vital energies may at length revive. When this occurs, the renewed excitement of the part is sometimes so little changed in kind, and rises so slightly above the normal standard, that its healthy functions are speedily restored. When not thus restricted, an excessive, local, morbid excitement ensues, with phenomena of inflammation so like those produced in the other mode, as not to be distinguishable from them. The fever is gotten up under the law already announced, but the mode is more complex, and the subsequent progress of the case less simple. Thus, when the part is smitten and brought low in its vital energies, the whole organism feels the effect, and constitutional enfeeblement is added to local. The system has, of course, to rise from this condition, or death would occur without fever. When the general reaction takes place, the excitement may not be much perverted, nor exalted beyond physiological limits, or it may be both perverted and excessive, which constitutes it inflammatory fever. The circumstance which gives to cases of this kind the complexity of which I have spoken is this. During the depression, some organ, not reached by the remote cause, but participant in the general depression, may become the seat of passive congestion, and when the reaction takes place, of inflammation.

But we must stop here. A perfect phlogistic fever may be generated with any surface on which the remote cause has acted becoming inflamed. Such surface has merely been the medium through which the organism has been brought into a state of depression, and when reaction occurs, no inflammation may appear in it, but in some deeply-seated or sequestered organ; and this is undoubtedly very often the case, the seat of the inflammation being generally some part that was previously infirm, in a state of morbid sensibility, of languid circulation, or from a phlogistic diathesis about to pass into inflammation. Thus it is that changes of weather, acting on the skin and mucous membranes of the lungs, awaken inflammation in the pleura, the peritoneum, or the joints. In these cases, the inflammation and the fever—different parts of one reaction—may arise at the same time, or either may take precedence, for a brief period, of the other.

V. We have already recognized an enervated state of the body from previous disease, a poorly nourished frame, an organism rendered feeble by close housing, and a degradation of the functions from sedentary employments carried on in cold, damp, and unventilated apartments, as among the predisposing causes of phlegmasiæ. Sometimes, perhaps, they are producing causes; but in general exciting agents are required, which throw, and that readily, too, the innervation and circulation into the state above

cribed, out of which inflammation and fever arise, notwithstanding the causes might have been altogether insufficient to produce depression in a sound and vigorous system. Thus it is that those who *seem* to be *most* secure from the phlegmasiæ, are, if subjected to the action of exciting causes, most likely to suffer with them. The inflammations thus generated are, in many cases, from the low state of the vital forces previously existing, of a subacute or sluggish character, approaching to simple congestions; but, under the influence of powerful exciting causes, they are sometimes acute, destructive, and dangerous, in proportion to the pre-existing infirmities of the patient. These infirmities may prevent the development of striking morbid phenomena, yet the work of destruction will not be less, but even the more certain; as the dry leaves of our woods in autumn are speedily consumed, without sending forth the more conspicuous flame of the sturdy and slowly burning trees.

VI. It remains to speak of the opposite predisposition, characterized by abundance of rich blood, and a vigorous state of the solids. The system is then rising into super-excitement, and the upward impulse given it even by a slight exciting cause, as a gust of passion, a debauch, the over-exertion of an hour, or a limited change of weather, may establish inflammation and fever, *without* previous depression, or with that which is both *inconsiderable* and *transient*. Some organ which already received as much blood as it could transform and transmit, now becomes oppressed, and a sudden change of function takes place, from nutrition and special secretion, to the morbid products of inflammation. The phlegmasiæ thus originated, manifest themselves by violent symptoms, and demand early and active antiphlogistic treatment; under which, however, they yield with greater certainty, than those which are rooted in constitutions of a deranged and feeble kind.

Having considered (historically) the different modes in which the phlegmasiæ arise, let us briefly inquire by the light of facts into their intrinsic nature. This may be done under the two heads of inflammation and fever.

VII. In the inflamed part there is not an abolition or even reduction of the innervation, on the contrary, it is morbidly active, as far at least as the production of sensation is concerned; nor is there a diminution, but an excess of blood, without which indeed the phenomena of inflammation could not exist. The calefacient function, depending apparently on nervous influence and the presence of arterial blood, is augmented in activity, the circulation through the central parts of the inflamed organ or tissue is arrested, but increased in velocity and volume through the circumferential; the function of nutrition is suspended, and whatever special secretory function the part may perform is suppressed or perverted in mode, yet the structure is not idle, for other secretory actions are set up, and frequently proceed with great activity. In this morbid condition, the danger to the struc-

ture is twofold: first, from the lesion of the innervation; second, from the suspension of nutrition, which favors softening; third, from the infiltrations of the new secretions into the affected tissues. Should the organ be one of high rank, the state in which we now find it may destroy life in two concurrent modes: first, by the sympathy of the other parts of the organism in its sufferings, which is effected through the nervous system; second, by its becoming totally disqualified for the discharge of its special function, when others dependent on or linked with it, can no longer perform theirs.

VIII. When we turn from the part in a state of inflammation to any part in a state of fever, we find the innervation in that morbid condition which renders all the healthful stimulants of the nervous system disagreeable; their sensibility is not diminished but rather increased, for aches and pains with physical impatience and restlessness prevail; the calefacient function is moreover augmented in its activity; all the special functions of secretion are interrupted or perverted, and the function of nutrition is suspended, as appears from the fact, that the patient comes out of the attack in a state of emaciation proportionate to its intensity or duration. We find also that inflammations may arise in new parts, either from their sympathy with the organ first affected, or from the momentum given the blood by the heart, which seems as it were to have appropriated to itself the contractility of the apparatus of locomotion, now in a state of enfeeblement, corresponding inversely to the intensity of the fever, and the force of the central organ of the circulation. The reactive influence of this condition on the inflamed organ is pernicious, and, at the same time, as it exhausts the energies of the organism, and takes away its capability of bearing up against the depressing influence of the inflammation, we need not wonder that such an attack may at an early period prove fatal.

We must turn from the state of the solids, and the distribution of the blood, to the condition of that fluid in the phlegmasiæ, and in doing this I must avail myself of such researches as have lately, and *but lately*, been made by the chemico-pathologists of Europe, whose greater means and opportunities of experimental inquiry, not less than their profounder science, have made them our teachers. As I am writing for my own scattered and insulated countrymen, many of whom have never seen the researches to which I allude, I shall give to this article an extension, which otherwise would not be demanded.

SECTION II.

CONDITION OF THE BLOOD IN THE PHLEGMASIÆ.

I. The Fibrine.—Every medical practitioner knows, that in phlogistic fevers, the drawn blood, on coagulating, exhibits on its surface a buffy or

sizy coat. This crust, consisting of fibrine arranged into a membrane, smooth on the surface, but dipping into the clot, is never absent when the inflammation is sufficiently extensive or intense to excite fever; perhaps even when below the degree which can disturb the organism at large. But while its absence would prove that inflammation does *not* exist, its presence does not necessarily imply that pathological state; for, as we shall hereafter see, there are conditions of the blood, which lead to its formation independently of inflammation or fever. For this crust to show itself, it is necessary, that the relative physiological proportions of fibrine and red corpuscles should be changed. An increase of both, or a decrease of both in the same ratio, will not produce it; but an augmentation of the former, while the latter remains normal, or a decrease of the red corpuscles, while the fibrine continues undiminished or augmented, creates it; and the thickness of the crust, *cæteris paribus*, will be in proportion to the loss of physiological balance between the two proximate elements, and to the absolute quantity of fibrine.

Thus, if its quantity should rise to a maximum, the red corpuscles remaining undiminished, the thickness of the buffy coat should be greater than if it remained normal, and the same loss of physiological proportion resulted from a reduction of the red corpuscles. Finally, it would attain its greatest thickness under a simultaneous increase of fibrine and decrease of the corpuscles.

I was long since convinced that the current theory of the buffy coat being merely the effect of a slower coagulation of the blood, thus allowing time for the heavier, colored corpuscles to subside, was, as an explanation of the whole phenomenon, defective; for, 1st, I have often witnessed an earlier coagulation of inflammatory than of healthy blood; though I admit that the reverse is generally the case; 2d. An experienced eye can generally predict, while the blood is still flowing, that it will throw up a sizy covering, from observing a peculiar dun, slate, or leaden hue, which seems to result from an immediate precipitation of a portion of the corpuscles, and a consequent diminution of the red color of the surface, composed, as it then chiefly is, of the liquid fibrine or the liquor sanguinis. The hypothesis suggested by this observation was, that inflammation increases the specific gravity of the red corpuscles, diminishes that of the fibrine, and establishes between them a divellent tendency; or bestows on the corpuscular element a greater attraction of aggregation, which might follow as a consequence of a diminished attraction for the fibrinous element.

Without pursuing these speculations, the last of which has lately been supported by several able physiologists,* we may come at once to an increased *production* of fibrine, as the great cause of the buffy coat in the phlogistic fevers. Although not the first to discover this condition, Andral, and

* Alison's Outlines of Physiology. Carpenter's Human Physiology.

his coadjutor, Gavarret, have, by a long and careful series of experiments, given us the most exact information concerning it.* After many analyses of healthy blood, they came to the conclusion that, in Paris, three parts in a thousand may be taken as the average quantity of fibrine, and by this standard they measured the results of their experiments on the blood of patients laboring under phlogistic fevers. In every instance they found the quantity of fibrine to rise above this number. In mild inflammations, the increase was small, but in the intense it was from 200 to 300 per cent., that is, to amounts indicated by 6, 9, and 12, that of normal blood being 3. From their Essay, and the "Chemistry of Man," by Simon, I have collected two hundred observations, which give an average that is within a fraction of 7; so that we may conclude that in the phlogistic fevers of the continent of Europe, the common increase of fibrine is about 133 per cent. With such an augmentation of this element of the blood, its slower coagulation (an admitted phenomenon, to which, however, as we have seen, there are exceptions), appears remarkable, as the opposite might be expected. In explanation of the anomaly, Andral has suggested, that the new fibrine is less coagulable than the old, and that its presence occasions a slower coagulation; and in the present state of our knowledge, no better explanation can perhaps be offered. In different cases the firmness of the buffy coat displays considerable variation, not resulting merely from its thickness, but from the cohesion of its particles. This may in part depend on the quality of the fibrine, in part, perhaps, on the presence of entangled red corpuscles. When the cohesive attraction is great, the surface of the clot becomes cupped. In estimating the grade of inflammation, by the amount and compactness of the buffy coat, the physician must bear in mind, that if the blood flow into a deep and narrow vessel, that coat will be thicker than if the vessel be broad; that if it be metallic the coagulation will be quickened; finally, that its flowing *guttatim*, or in a small or feeble stream, will diminish the amount of buff. When it is a question, whether inflammation exist, or venesection should be repeated, these circumstances acquire considerable importance. We must not suppose that in phlogistic blood, all the fibrine is found in the buff, for it extends in an open network throughout the coagulum, which, indeed, but for its presence would have no existence; inasmuch as the corpuscles would fall and constitute a stratum in the bottom of the bowl. Andral has sought to determine the relative quantities of fibrine in the buffy coat and the coagulum beneath. In five patients, three with pneumonia and two with rheumatism, the average results were, buffy coat 6·64, clot beneath 2·05; so that more than three-fourths are found in the former.

To the condition of the blood we have been considering, Simon has applied the term *hyperinosis*.†

* Essay on the Blood in Disease, Phil., 1844.

† Formed of Greek words, signifying excess of flesh or the fibre of flesh.

THE RED CORPUSCLES.—According to Andral,* the corpuscles, in ny blood, make one hundred and twenty-seven parts in a thousand, or y-two times as much as the fibrine. His experiments have led him to conclusion that they are neither increased nor diminished by these vers; but Simon† declares that they are diminished. Unable to consult he original tables of the former,‡ I am obliged to rely on certain abstracts from them, incorporated with his own results and those of other German experimenters, by Simon. With as much care as possible, I have collected five cases of first bleedings, in which the amount of corpuscles is stated nnection with the amount of fibrin, and the following are the averages:

TABLE.

Andral and Gavarret, 40 first bleedings,	5·38 fibrine,	113·84 corpuscles,	
Simon, and others, 15 " "	1·95 "	92·05	"
Mean of 55 " "	4·72 "	107·90	"
Mean of healthy blood,	3·00 "	127·00	"
Cases in which the corpuscles rose above the healthy mean,		13.	
Highest of the whole,		148·80	
Lowest of the whole,		42·08	
Cases in which the reduction was so small as not to be below a physiological mean range, say,		120 = 10.	

From this table it appears that the phlogistic fevers commonly diminish the corpuscular element; but that they *may* exist without producing that effect. Thus, in ten cases, the numbers expressing them varied from 120 to 127, which may be regarded as within physiological limits; and in thirteen, the number was so far above 127, as to give an average of 137·76, or 10·76 more than the normal quantity, 127. The effect of the phlegmasiæ upon the corpuscles is, then, far from being uniform, as they may exist with a normal, an increased, or a diminished quantity of that element, while, as we have seen, they are *always* accompanied by increase of fibrine. But a different, and, perhaps, better view may be taken of this matter. The physiological range of the numbers which express the corpuscles is wide, and it may be that in all the cases in which they were found above the standard of health on first bleeding, they had been still higher, previously to the attack, and were then undergoing reductions, and with the fact before us, that in fifty-five cases, their average aggregate was 19·10 below the healthy number, 127, we are, perhaps, required to conclude that while the phlogistic fevers increase the amount of fibrine, they diminish that of the corpuscles.

However this may be, it is unquestionable that in the *progress* of these fevers, the corpuscles do undergo a signal reduction. If the conclusion to which we have just come be admitted, this reduction is no doubt owing in part to the direct influence of the fever; but there is another and much more operative cause—the bloodletting employed for its cure. The pro-

* Essay, p. 61. † Chem. of Man, p. 207. ‡ Annales de Chimie et Physique.

fession is familiar with the fact, that while venesection, practised for the cure of these fevers, leaves the proportion of fibrine unaffected, it rapidly reduces the quantity of the corpuscles. This will appear still more conclusively from the following table, compiled from results collected with those which have just been given.

TABLE.

Mean of 55 first bleedings,	5·72	fibrine,	107·90	corpuscles.
Mean of 23 second "	5·94	"	105·22	"
Mean of 10 third "	6·97	"	99·34	"
Mean of 12 fourth and fifth bleedings,	7·84	"	95·08	"

Several reflections and conclusions are suggested by this table.

1. It may be said that the reduction in the amount of corpuscles which it presents, is owing entirely to the influence of the fever; but as venesection produces that effect in health, we cannot doubt its influence here; and hence there are two causes operating on the phlegmasiæ—one pathological, the other therapeutic—to cause such reduction. Of the irrelative agency, it is impossible to speak. The former may or may not be according to the intensity of the fever, the latter is in proportion to the amount of blood drawn.

2. It is familiar to all physicians that, in many of the phlegmasiæ, the blood first drawn is not buffy. In these cases, we may suppose the cause to be twofold: 1st. The fibrine has not yet been augmented to any great degree; 2d. The corpuscles are still abundant. In other words, the proportion between them is not such as to favor the production of the buffy coat. A second bleeding, only a few hours after the first, may present it, because the previous loss of blood, has reduced the number of corpuscles.

3. In the chronic phlegmasiæ—I have seen it in rheumatism and metritis—after repeated and (for some time) copious venesection, the blood still remains sizy and cupped, while the coagulum is very small. In these cases, which, formerly, I did not understand, the buffy blood is no longer the exponent or sign of inflammation, as it was in the beginning, but of a greatly reduced volume of the corpuscles.

4. We are all aware that if bloodletting be carried beyond the necessary degree in the treatment of the acute phlegmasiæ, a state of constitutional irritation is induced, which essentially resembles the hysterical affection of chlorotic girls, and women of a lymphatic temperament, in the time of the final cessation of the menses. In all these cases a great reduction in the red corpuscles is the negative cause of the perturbation of the nervous system; and all may show buffy blood, not from an increase of fibrine, but a decrease of corpuscles. I presume there are not many physicians who have failed to meet with this appearance of the blood after very copious depletion, suggesting that the inflammation was still raging, although unquestionable

of constitutional irritation, indicative of a change of diathesis, had developed. We are indebted to the researches of modern hæmatologists for the elucidation of this obscure pathological condition.

THE SERUM.—The average quantity of water in the serum of the blood in the phlegmasiæ, according to sixty-six experiments by Andral and Gavarret, was 801·00, that of healthy serum being 790; thus in the phlegmasiæ, this element is increased eleven-thousandths above the normal standard. This augmentation is doubtless owing to the reduced renal, and (almost suspended) perspiratory secretions. The solid ingredients of the serum are likewise increased. Thus in fifty-seven of Andral's cases, the solid residue of the serum amounted on an average to 83·77, that of the healthy fluid being 80. It is not known whether this s in the saline or the organic principles of that fluid. A dimin the ecretion of urine, so commonly attendant on the phlegmasiæ, w ugge an accumulation in the blood of its saline principles; but whether addition of 3·77 parts to the solid residue is from that source, or t also an increase of albumen, is unknown. We are, I think, at liberty onclude, that in the phlegmasiæ the latter animal principle is not dimi l, but may be a little increased. Whatever modification in the chemical e ents of the serum may take place its alkaline reaction still continues. The serum which is effused into the cellular and serous cavities when inflamed, is said by Andral to contain less albumen than that which remains behind.

IV. FATTY AND EXTRACTIVE MATTERS.—The fat is declared by Simon* to be increased in the phlegmasiæ; but neither his own facts nor those introduced by his translator, Dr. Day, bear out the assertion. Nothing seems to be known concerning the state of what have been named the extractive matters, in the blood of those laboring under the phlegmasiæ; but it cannot be doubted, that they suffer modification. Indeed, when we observe the changes which occur in the quantity if not in the quality of the fibrine and corpuscles, it is difficult not to believe, that many others, affecting perhaps the whole constitution of that fluid, take place. Where so many elements are united, and so many isomeric changes are every moment taking place, it appears quite impossible, if one element should be modified by disease, that the others should continue unaffected. But the time is probably distant, when a thorough knowledge of the condition of the blood in these or any other fevers, will be acquired. The delicacy and difficulty of the chemical manipulations necessary to such inquiries, place them beyond the reach of the mere physician, especially if resident in a newly settled country; and leave the field to be occupied by a comparatively small number.

* Chem. of Man, p. 206.

SECTION III.

SPECULATIONS ON THE PRODUCTION OF HYPERINOSIS.

INFLAMMATION is the only known disease in which the hyperinosis of the blood is found, not the only one in which a buffy coat appears, for we must bear in mind a certain reduction in the amount of corpuscles, will lead to the production of the buffy coat, even when a state of hyperinosis or deficient fibrine exists. Now is inflammation a *cause* as well as an invariable accompaniment of excess of fibrine? May it not be an effect, and may not the disease have its origin in the blood? With the best pathologists, I think the latter opinion untenable, for—1st. A very rapid development of fibrine takes place with the rise of inflammation in a part subjected to mechanical injury, the individual up to the time having been in perfect health. 2d. Every physician has seen the supervention of inflammation in the brain or lungs, for example, in typhous fevers, which are accompanied as already shown by hyperinosis or deficient fibrine. 3d. It has often happened to physicians to bleed patients and observe no buff, immediately before they have been attacked by some acute inflammation, which, however, gave to the blood, when drawn, soon afterwards the characteristic crust. These observations appear to be conclusive against the hypothesis that hyperinosis causes inflammation. We are compelled then to regard it as either solely a product of that pathological state; or of that and the disorder in the organism, generally occasioned by, or accompanying it—in other words of the fever. The determination of the question how far the fever concurs? is not without difficulty; for the reason that an inflammation of such limited extent or violence as not to awaken some degree of fever, could not be expected to increase the fibrine of the blood, so far as to make it appreciable; and whenever it becomes more intense, a constitutional disturbance which augments *pari passu* with the inflammation, is the inevitable effect. If either abates, the inordinate development of fibrine likewise abates; but this decides nothing, inasmuch as a mitigation or subdual of one, is necessarily *accompanied* by a corresponding abatement of the other.

Whatever may be the participation of the general system in the production of hyperinosis, it cannot I think be denied that the inflamed part is a chief seat of its elaboration. This is demonstrated by the great amount which is effused into its parenchyma, or upon its surface, where it begins with the dawn of heat and redness, and continues to the final cicatrization, if the inflammation should not be resolved. An inflamed part is indeed a gland, one of the secretions of which is the *liquor sanguinis*, or fibrine dissolved in serum.

Now, can we suppose that the excess of fibrine contained in the whole mass of blood is here elaborated and carried out by the circulation? I think we

ɪt; for—1st. The circulation *through* the inflamed organ is, as we have dy seen, suspended or greatly retarded, a condition unfavorable to the s of fibrine from it into the general circulation. 2d. A very limited inflammation seated in a highly vitalized and sensible part, will produce or is attended by an acute fever, in which the number for the fibrine will be high. May we not then ascribe to the fever itself a participation in the production of hyperinosis? They who might reply in the negative would rely on the fact, that we have fevers—intermittent, typhous, and eruptive, which are sometimes intense, but do not generate fibrine. But shall we conduct the argument, and rest our conclusion on a single analogy? Are there not specific types of fever? Are not the exhalations from the body of one in the eruptive stage of [illegible] o different from those in measles, as that one will produce in t [illegible] a pustular, the other a papular eruption; and do not these exhalations [illegible] both differ essentially from those of a typhous patient, which produce n [illegible]er small-pox nor measles, but a continued fever of a different k [illegible]o not the exhalations from the whole, differ from those in autumnal or [illegible]ow fever? In all these cases the exhalations are from the whole body, [illegible]rated in it, and not dependent on the morbid action in a particular part. Now the exhalations of which I have spoken are derived from the bl[illegible]od imply transformation or metamorphosis of some of its materials; and if this can occur under the influence of these fevers, why may not a different modification of the principles of the blood, resulting in a state of hyperinosis, or excess of fibrine occur in the phlogistic fevers? If a gaseous poison can be exhaled from the whole body, in the eruptive fever of small-pox, that is precisely of the same nature with that secreted subsequently at a particular inflamed spot in the skin, why may not fibrine be generated in the phlogistic fevers, in the whole circulation as well as in the inflamed organ? I do not perceive that any reason could be assigned why it cannot, and am brought therefore to the conclusion, that the system at large *may* co-operate with an inflamed part in the production of fibrine. This, however, does not prove that it does so co-operate, nevertheless it prepares the way for such a conclusion; in proceeding to which, I ask the question, whether on physiological principles, the general system ought not, or might not be expected, thus to concur with the inflamed part? Such concurrence it appears to me should be considered natural. It is natural for a part to spread the mode of action which is established in it, throughout the whole. An atom of variolous poison inserted in the skin, brings the organism at large into the same type of morbid action with the point to which it is applied. This it must do in one of two modes: by acting on the blood, or on the nervous system. Now both of these modes are open to the inflamed organ. It may cause a commencement of changes in the blood, which may be adopted and continued by the whole system; or it may reach the system through the medium of the nerves; or the two modes may be combined. The extension of the influence of the inflamed

organ, I suppose to be through the innervation. Modified in the part affected, the state of the nervous system becomes modified throughout the whole organism, and this constitutes the basis of the phlogistic diathesis, the full development of which is found in the increased momentum of the circulation, and augmented production of fibrine. That the circulation can be exalted or depressed, nutrition increased or retarded, and the various secretions promoted, suppressed, or perverted, by modifying the innervation, are facts which can neither be denied nor explained.

In the diseases under consideration, all the influences of the nervous system tend to the creation of excitement—to the getting up of an inflammatory organism, in harmony with that of the affected part. It is not difficult to perceive *why* all this should happen, nor impossible to perceive its *final cause*. Inflammation, notwithstanding its destructive ravages, is in fact a reparative process, and under a great variety of lesions, a *sine qua non*, to the preservation of life. In all such cases it is essentially physiological, and fibrine is the material which it generates and applies to the end to be accomplished. It is equally physiological, that the apparatus of the circulation at large should co-operate with the blood itself, and in many severe injuries, unless they do, the patient sinks. The whole must aid the part, or it cannot recover.

I am aware that reparation of injury may be effected without inflammation, but have always seen it confined to simple and limited solutions of continuity, unattended with contusion, laceration, or the introduction into the wound of any foreign matters. Every physician knows that in a few hours after venesection, he may pull open the orifice and let the blood flow anew, after which reunion seldom takes place without some degree of inflammation; but if he postpone the second bleeding till the next day, he must make a new incision, for then he will find the first quite healed up without any sign or feeling of inflammation having existed. In this case the organization of the stratum of fibrine between the sides of the wound is instantaneous, and the integrity of the part is restored.

We are familiar with other examples of the union of fibrine to the tissues with which it may happen to be in contact. Thus the blood of an artery between a ligature and the first branch above, has its fibrine united to the parietes of the vessel, which from a hollow is thus transformed into a solid cylinder, apparently without the intervention of inflammation. But here the parts may be said to be in a physiological condition. Another example is the adhesion, often of a decided kind, between the columnæ carneæ of the heart and portions of the coagulum of fibrine, known in the dissecting room under the name of polypus. This coagulation and adhesion takes place, no doubt, before, not after death, and appears to occur independently of endocarditis, though, perhaps, is chiefly found in cases whose development of fibrine is great. But the conditions favorable to the healing of wounds without inflammation seldom concur, and whenever the wound is extensive, two

other conditions, well calculated to preclude such a desirable result, are produced. 1st. The hemorrhage, after the lips of the wound are compressed, will keep some portion of its sides from contact, and the serum and red corpuscles have to be removed by absorption. 2d. The shock given to the part by the instrument of violence, depresses its vital powers, and reaction is the *natural* effect. That reaction, whenever accompanied by hyperæmia, is inflammation. Dr. Macartney* insists, that a reaction of such a grade as to constitute inflammation is not necessary; but rather injurious to the object in view. It would be more correct to say that the inflammation may rise beyond the required degree, and is then unfavorable. It is the duty of the surgeon to restrain but not prevent it entirely. Should he attempt the latter he would perhaps not often succeed, and when he did, his interference might so keep down the *natural* reaction, that no adhesion would take place notwithstanding the presence of fibrine. That inflammation of a surface is favorable to its union with another surface is proved by the fact that the coagulating lymph thrown out in pleurisy and peritonitis, is often found to invest the lungs and the abdominal viscera without occasioning their adhesion to the parietes of the chest and abdomen, simply because their lining membranes were not inflamed. As a hot and cold piece of iron cannot be welded, so as a general fact a certain amount of inflammation is necessary in both cut surfaces to effect their union.

It remains to consider how either the inflamed part or the system at large generates the new fibrine. We may safely assume that there is but one process by which this element *can* be prepared, and, therefore, that the new fibrine is formed out of the same or analogous materials, and by the same chemico-vital action with that previously existing. That natural function is then more active in the phlogistic fevers than in health, and produces a quasi hypertrophy of this element of the blood; a view that is in keeping with those just taken, and confirmatory of the theory that the phlogistic fevers, both in the constitutional and local affection, depart less from a physiological type than the other groups, which depend on specific morbid poisons, while these depend on the irregular, excessive, or defective action of the agents which are the ordinary supporters of life.

But whence comes the fibrine of healthy blood? Undoubtedly from our food, for it is detected in the chyle after it has passed through the mesenteric ganglia, if not before. But in the phlogistic fevers, food is withheld or the digestion of it is suspended; the supply through the thoracic duct is therefore interrupted, and, *a priori*, we should expect its amount in the blood to be diminished instead of being increased. The increase then must be out of and at the expense of some other protein element of the blood. Now, the others are the albumen of the serum, and the transparent globuline of the red corpuscles, regarded by Simon as a peculiar form of caseine, very nearly related to fibrine. Now, the researches of Andral and

* Treatise on Inflammation.

Gavarret have shown, that in the phlogistic fevers there is no reduction but rather an increase in the solid ingredients of the serum, of which the albumen is the chief; and we cannot, therefore, conclude that the increase of fibrine is at the expense of the albumen. On the other hand, as we have seen (p. 110), there is a reduction in the corpuscles, amounting, at the time of the first bleeding, in fifty-five experiments, to the average of 19·10 parts out of 127; which loss was found greater, at subsequent bleedings, until it rose to 32 parts of 127, when the fibrine has risen from 5·72 to 7·84.

Is it not, then, highly probable, that the transparent portion of the red corpuscles (globuline) is the material out of which the organism elaborates the new fibrine in the phlegmasiæ? And may it not be, as Simon has suggested (p. 292, Am. Ed.), that the fibrine found in the chyle is formed from the blood in the ganglia of the mesentery? This speculation, it will be perceived, carries with it the hypotheses, that the blood globules are formed before the fibrine, that the material for the latter, in the condition of globuline, is first subjected to the action of the air in the lungs, and afterwards converted by isometric chemico-vital action into fibrine, for the formation and reparation of the tissues. In its transition from globuline to fibrine, it probably displays itself in the blood in a corpuscular form, constituting the white or colorless corpuscles, at all times to be observed, but more abundant in the phlogistic fevers than in health, and, above all, most numerous in the blood of the inflamed part.* [The progress of investigation has proved that this increase in the relative quantity of the white corpuscles in inflammation is by no means constant, and that it occurs independently of that morbid condition, especially in cachectic subjects, in whom the liver, spleen, and lymphatic glands are enlarged, or otherwise diseased, and the diathesis is tuberculous. Professor J. H. Bennett has directed the attention of the profession to this disordered condition, which he has termed Leucocythæmia —white cell-blood.—Ed.]

But, from whatever source derived, we may conclude that the fibrine exerts a sustaining or exciting influence on the system; for in the adynamic fevers it is deficient in quantity. If such be its effects, its increase in the phlogistic fevers must be a source of aggravation. And this may explain several things not so explicable, perhaps, on any other hypothesis. 1st. Why they increase in violence independently of all external causes. The augmentation of the fibrine is the augmentation of an internal stimulus, which is not a poison but one of the sustainers of life, and, as we have already seen, the phlegmasiæ are produced by causes of that class. 2d. Why food is so much more pernicious in these fevers than others. It supplies new *materials* for the manufacture of fibrine. 3d. The great value of bloodletting, which, independently of other modes of action, diminishes not only the amount of fibrine in the bloodvessels, but the material out of which it is

* Carpenter's Physiology, p. 423.

formed. 4th. The great value of water, which serves to dilute the fibrinous plasma, and render it less exciting to the internal surface of the vessels.

Speculations which thus conform in their practical requirements, to what the experience of all ages has shown to be necessary, have at least the negative merit of being harmless.

CHAPTER IV.

PROGRESS, TERMINATIONS, AND ANATOMICAL LESIONS OF THE SIMPLE PHLEGMASIÆ.

SECTION I.

PROGRESS AND TERMINATIONS.

An inflamed organ has not unaptly been called a gland. Yet, although in health, it might have been a part which did *not* pour out a fluid, it was even then a gland; for while it passed forward the blood sent to it (a function of every vascular part), it took from that fluid, by endosmosis, the serum which lubricated its cells and surfaces, and the nutritive molecules which maintained the integrity of its tissues, in doing which it performed glandular functions. On the rise of an inflammation, the latter of these secretions is arrested, and continues suspended to the end; but the former as certainly increases, and this increase, the first effect of the hyperæmia, immediately adds to the tumefaction, which at first depends upon the congestion only. As long as the inflammation continues below a certain undefinable degree, nothing but simple serum is effused; rising above that grade of intensity, a portion, deserting the red corpuscles, flows off with the serous element in the form of a peculiar secretion—coagulating lymph. The serum may be reabsorbed, but the fibrine coagulates and remains, in a state of *error loci*.

The quantity thus extravasated is such as to suggest that hyperinosis of the general mass of blood which we have already reviewed as a pathological fact. But as the blood in the depths of the inflamed part is not changed, we are at liberty to assume that the production of fibrine from some other element of that fluid goes on more efficiently there than in the other organs which are only affected with fever. The part, in fact, is now in a state of orgasm, and may elaborate its peculiar secretion in corresponding quantities. Thus far, all that has passed from the vessels, or been developed in them, is analogous to the existing fluid and solid elements of the body, and need not be eliminated from it; but should the hyperæmia and the orgasm continue unabated, a second morbid product, pus, is formed from the same

materials with the first. But although elaborated from the same elements, that fluid is not analogous to any existing fluid of the system, but heterologous, and requires to be evacuated. Its production has relieved the organ from its hyperæmia, and the suffering consequent on that condition, but in doing so has created the necessity for an external discharge. Should this not take place, it may be absorbed, if the quantity be not great, and eliminated with the excretions, or deposited in the cellular tissue of some distant organ, constituting the cold abscess of the surgeons.

Now, let us look at the series of actions and events through which we have passed, with a view to antecedence and subsequence, or cause and effect. We find, then, that a *casus inflammationis* has directly or indirectly raised in a part an irritation or morbid excitement; this has retained, drawn into, or otherwise accumulated in its small vessels, an extraordinary quantity of arterial blood; this hyperæmia, the effect of the primary irritation, becomes, reactively, a cause of aggravation to the morbid condition of the solids which produced it; in this state of things, a new effect, the secretion of serum, and then of lymph, ensues, which may or may not pass on to that which is purulent. Thus, the products of the inflammation are mainly the effect of the hyperæmia; but that, without the co-operation of the irritated solids, would give us only the serous effusion consequent on passive congestion.

We may now see the difference between the inflamed organ, and another in the state of fever. Increase of secretion, nature's remedy for capillary congestion, and according to the laws of the living system, a necessary effect of such congestion, cannot take place without it. But there cannot be universal capillary congestion, and therefore there cannot be the third and last class of phenomena, the products of inflammation. The other organs may have their vital properties degraded, their nutrition suspended, and their functions perverted or arrested, without pouring out morbid secretions. Yet it may and often does happen that some organ becomes the seat of a new hyperæmia, and whenever this occurs, its legitimate effects, the morbid secretions of which we have so often spoken, show themselves.

An *acute* phlegmasia cannot endure very long, for reasons given in the last chapter; but reduced in violence, yet not subdued, it may assume a chronic form, and in that grade of excitement run on for an indefinite time. The lingering fever, not well sustained by the low and feeble inflammation, may at length cease altogether and the local affection alone remain, as it only might have existed in the beginning. But in other cases, when it is cured, the fever ceases.

The secretion of pus generally carries off or reduces the inflammation to such a point, as that the fever ceases; but if a large abscess remain unopened or its contents being discharged, an extensive surface secreting pus should remain, a new type of fever, the hectic, sets in, the study of which will come up hereafter.

SECTION II.

ANATOMICAL LESIONS.

WHAT microscopic changes of structure may exist in an organ when it is brought into that state which causes it to accumulate blood, has not, I suppose, been yet revealed. *A priori*, I see no great reason for admitting the existence of any; seeing that the tissues were built up and endowed with certain properties by some formative force, which, preceding their origin and residing in the unorganized fluids, could not be the effect of organization. The properties thus bestowed upon them, are what give efficacy to external agents in changing this mode of action. These aptitudes of organized and living matter, must, I apprehend, be received as ultimate facts, beneath which lies a region of transcendentalism. It would also, I think, be gratuitous and illogical to say that inflammation begins by an alteration of minute structure, seeing that its causes are not so applied as by its material presence to reach that structure in its minuteness, and give us, as the starting point, an anatomical derangement. I prefer, therefore (excluding the effects of mechanical violence), to speak of the first link as a physiological lesion, the result of the influence of causes exerting their power on the susceptibilities of the part.

But the next link of the chain does present an anatomical lesion as far as a change in the relative quantity of solids and fluids *can* constitute such a lesion. The part contains more blood than before, and some of it extravasated upon the surface or into the interstices of the organ; this condition, however, being an effect of a previous morbid state, does not give an organic origin to the inflammation, even if it could with greater propriety than it can be denominated a derangement of structure. With the secretion or extravasation of the albuminous elements of the blood into masses of the organ, and the adhesion of the white corpuscles or the coagulating fibrine to the inner surface of the small vessels, the true anatomical lesions have their beginning. In these pathological events, taken in connection with that hyperinœsis which keeps up the supply of the plastic material, we find the parentage of that richest and most diversified, yet (referring to the mission of our profession) melancholy exhibition of morbid specimens which our cabinets display.

We are indebted to modern pathological anatomists for the establishment of the great and comprehensive fact, that the fibrinous element of the blood increased, separated in general from the colored corpuscles, but dissolved in the serum, can be so diffused and so carry itself among the structures, as to produce the derangements, often continuing through a long life, of which I have spoken.

But we must return to the condition in which the inflamed organ is found immediately after death from one of the acute phlegmasiæ. Its tissues are

softened and tender; its vessels are engorged with florid blood, which, from the presence of so much adhering fibrine, can be but partially washed or pressed out; a portion of it, moreover, is extravasated, giving punctate or larger ecchymoses. At the same time the ramiform aspect of the vascular tissue is greatly obscured; the areolar tissue is increased in gravity by infiltrations of fibrine, and whatever cells the organ may have had are filled with the same material. On the mucous surfaces it is but seldom found, but it overspreads the serous or coagulated floats in their cavities. If suppuration have taken place, it is still present, and often coagulates around the pus so as to prevent its diffusion. Seen at a more advanced period, it is found to have become organized, participates in the circulation of the blood, adheres to the tissues, and often agglutinates the organs together. Continuing to contract, it loses its proper vessels, acquires greater firmness, obliterates minute cells and the areolar tissue, and increases the density of the organ, while it effaces the original structure. If thrown upon the surface, its ready union and continued contraction give external compression with change of form; and thus continuing to act within or without, sometimes in both modes, it effects those transformations and vascular obliterations, which not only annihilate the functions of a part, but by interrupting its nutrition, at last lead to its softening and gradual absorption.

In opposition to all these injuries, however, we may place its inherent plasticity, its capacity for forming itself into tissues analogous to those of the whole body, and its indispensable agency in the reunion of divided parts, and the reproduction of those which have been lost by external violence, suppuration, sloughing, or gangrene.

Of suppuration as a structural lesion it will be proper to say something more. All the organs and tissues are not equally prone to suppuration when inflamed. It chiefly occurs in the parenchymatous, the cellular, and the mucous. Hence, abscesses of the liver, kidney, spleen, brain, the tonsils, the parotid glands, and the lungs when tubercular, are not uncommon events. Those of the subcutaneous and intermuscular tissue are, however, more frequent. The mucous membranes may secrete pus without a visible lesion of structure, but those of the digestive canal are especially apt to be affected with ulceration; a condition which quite as readily establishes itself in skin, and the sero-mucous covering of the eye.

When the hyperæmia of an inflamed organ is very great, and the *vis a tergo* of the heart is either very powerful, or from feebleness of constitution very small, the turgid vessels do not assume that kind of secretory action which relieves them; but fail in energy, and the death of the affected part ensues. If the organ in which this occurs should be essential to life, the death of the rest is of course inevitable; if otherwise, inflammation with secretion of pus is set up around the gangrened part, and may lead to its separation, when restoration more or less perfect takes place through the medium of granulation; the lost tissues being reproduced out of coagulating lymph.

Of all the tissues, the skin and subjacent cellular substance and the mucous membranes, are most liable to this serious result of inflammation.

CHAPTER V.

INDICATIONS AND MEANS OF CURE.

THE phlegmasiæ or phlogistic fevers, constitute an extensive and the only group of diseases, which, in their pathology, resemble each other so closely, that the same therapeutic principles apply equally to the whole. The *methodus medendi* suggested by these principles is called the *antiphlogistic treatment*, of which we must now make a short but comprehensive survey.

In coming up to this study, we must recollect that every phlogistic fever presents a high tone of excitement, or an increase of vital energy in the heart and arteries, a state of hyperinosis of the blood, and an active hyperæmia of one or more of the organs or tissues. That this local hyperæmia sympathetically excites the heart and increases the energy of its contractions, which in turn, by augmenting the momentum or *vis a tergo* of the circulation, injects the inflamed organ with a force that aggravates the inflammation. That in connection with this remarkable disturbance of the function of circulation, there is a marked perturbation of the associate function of innervation, leading to the manifestation of acute pain and tenderness in the inflamed part; pains and aches in various other parts not affected with hyperæmia; and increased but morbid sensibility in the nerves of special sensation, including those which take cognizance of changes of temperature.

Such, in a condensed view, being the condition of the system, the following indications of cure present themselves: 1. To subdue or reduce the general and the local excitements. 2. To alter or change the type or mode of morbid action. 3. To soothe excessive sensibility and excitability, that is, to moderate constitutional irritation. 4. To equalize the capillary circulation, and thus by revulsion to relieve the organ or organs which are in a state of hyperæmia, either passive or active. 5. To revive the impaired or suspended excreto-secretions, and thus depurate the blood rendered impure by their suspension, not less than by the morbid diathesis of the system throughout the fever. 6. To restore the lost strength of the organs of nutritive or organic life. Let us consider these *seriatim*.

I. TO REDUCE THE EXCITEMENT.—When we look at a catalogue of the means, which the experience of the world has declared to be most efficacious in the fulfilment of this most important indication, we find that they may be referred to three heads. 1. Exclusion; 2. Abstraction; 3. Refrigeration.

1. *Of Exclusion.*—By withholding or excluding from the patient, certain agents, which in health give normal activity to the functions, we diminish the morbid and energetic activity which it is our object to subdue. The simple enumeration of them, carries conviction to the mind that their exclusion must be attended with benefit, since their application would produce aggravation. The principal are:—1st. Food; 2d. Stimulating drinks; 3d. Caloric; 4th. Locomotion; 5th. Light and sound; 6th. Society. A rigid avoidance of these stimuli is sometimes sufficient to effect the reduction of a mild phlogistic fever; and of course such an avoidance is indispensable to the successful treatment of the more acute. As a general fact the instincts of the patient are unerring in reference to the whole, but a false theory of fever, in former times, suggested the avoidance of cool, rather than of hot air, and established a popular prejudice, the hereditary propagation of which has not yet been fully arrested.

2. *Abstraction.*—The most efficient means of lowering the excitement in the phlogistic fevers belong to this head; and being, in their nature, of a more positive and powerful kind, they cannot, like the negative measures referred to in the last head, be dismissed with a bare enumeration. Let us consider them in the order of their efficiency.

a. Bloodletting.—The first effects of the loss of blood are found in the organs of circulation, on which that fluid acts in two ways; first, by the stimulus of distension; second, by its exciting qualities, physiologically adapted to the contractility of the heart. The next effect is on the brain, which, from the diminished volume of the blood and the reduced power of the heart, is less violently injected, and has the momentum of its circulation diminished. In this condition its reactive influence on the heart and vascular system is moderated, tending still further to bring down the energy of the circulatory apparatus. Effects of a similar kind are probably produced in and through the spinal cord. Intimately related to these are the effects of the loss of blood on the arterial trunks and capillaries, which, if it be suddenly and copiously drawn, do not contract *pari passu*, and, therefore, lose the stimulus of distension, as well as that imparted by the specific properties of the blood. This reduction of the force of the heart diminishes the *vis à tergo* of the blood going to the inflamed organ, a source of relief; while the venous depletion favors the escape of blood from it, and thus promotes the resolution of the hyperæmia, the reactive influence of the inflamed organ on the heart, through the nervous system, being at the same time abated. These results, however, when the fever is violent, are not obtained by a single venesection, and some cases demand several. Yet it has been discovered that the fibrine increases in the midst of these repeated bleedings, and some physicians, in opposition to an experience that seems entitled to confidence, have almost doubted their propriety. But we must remember that the hyperinosis is not the cause, but the effect of the inflammation, and that it must, of necessity, continue till that pathological condition is

ed; still further, we must recollect that repeated bleedings rapidly
the quantity of red corpuscles, which are, perhaps, the *stimulating*,
fibrine is the *nutrient* element of the blood. In short, it may be
the directly enfeebling effects of bloodletting are mainly referable to
ss of the corpuscles. To all this, I may add that bloodletting gives
to other measures, and is, therefore, indirectly beneficial.

ing in these various modes, we need not be surprised that venesection,
ir tively resorted to even by savages, has, at all times, been regarded
an indispensable remedy in the phlogistic fevers. But, to be successful, it
be employed in the manner and degree that will produce the effects
have been enumerated.

al bleeding must come after, n[illegible]before, general bleeding. To be
, it must either be employed before the heart has come into full sym-
with the inflamed organ, or after its force has been reduced by vene-
. Local bleeding diminishes the tu rgescence of the capillaries of the
in[illegible]ed part, which abates the acti[illegible]f the lymphatic secretion set up
in them, and favors the vascular con[illegible]ion by which they send forward
the retained blood. Thus, by relieving he organ, its reactive, irritating
influence on the heart is abated, whe course, that organ acts with less
violence, an effect which has been erroneously ascribed to the small diminu-
tion thus produced in the general mass of blood.

In addition to all the direct benefits which bloodletting confers, we must take into account its modifying influence on the action of other remedies. Thus, when the vessels are full, and the power of the heart great, the means appropriate to fulfil other indications will often fail to produce their wonted effects, and may even do harm before the employment of that remedy. This is true of emetics, cathartics, sudorifics, antiphlogistics, alterants, revulsives, and narcotics, none of which can be successfully employed, while the arterial excitement is above a certain point; but which operate kindly after the adequate use of the lancet.

b. Purging, only considered here as a means of fulfilling the first indication, should be viewed under two aspects, and employed for immediate purposes. In the first place, it removes from the stomach and bowels the undigested and feculent accumulations, which, retained there after the fever commences, aggravate it. For this object, saline, and other gentle aperients, or even large emollient injections, if the stomach be irritable, are generally sufficient, without the risk of irritating the bowels. In some cases, this simple expulsion of the existing contents of the *primæ viæ*, in connection with the exclusions which have been enumerated under the preceding head, will arrest the fever. But it frequently happens, that the arterial system is so highly excited that the aperient acts but imperfectly, or not at all, till the lancet is employed. Secondly. Purging may be made to assist in depleting from the bloodvessels; but to do this, it must be excited by articles which promote secretion from the liver and mucous membrane. Given

early in the fever, however, they often fail of the desired effect, and may even invite the inflammation into the mucous membrane; for those of a drastic and hydragogue character are required. In all cases of high phlogistic excitement, the lancet, for the reasons already given, should either precede or immediately follow on their exhibition. This rule is often violated by physicians who are adverse to bleeding, or lack firmness in regard to the fears or prejudices of patients; and thus in false reliance on purging, as a means of lowering the tone of vascular excitement, the disease goes on to a fatal termination.

c. Refrigerants.—It cannot, I think, be doubted, that in whatever manner—whether from external application or internal development—the free caloric of the body is raised above the normal standard, it increases the morbid excitement. The abstraction or absorption, therefore, of the heat, liberated from a latent to a free condition, in the phlogistic fevers, must be regarded as an important therapeutic measure. This may be accomplished, 1st. By cool air in a free current; 2d. By the application of cold, cool, or tepid water to the surface of the body, when the seat of the inflammation does not forbid it, and also to the inflamed part when external; which applications must be made in such manner as not to produce reaction, that is, a very low temperature should be avoided. 3d. By copious internal dilution with cold or tepid water. The lodgment in the stomach of a large quantity of that liquid, having a temperature but a little lower than that of the body, cannot fail to reduce its heat; but the effect is greatly augmented by the passage of the fluid into the portal veins, and thence into the general circulation. In thus traversing the body, it absorbs caloric, dilutes the superabundant fibrine, and may be supposed to diminish its tendency to coagulation in the capillaries, which would lay the foundations of secondary inflammations; still farther, by acting on the kidneys, it carries out the irritating elements of the urine, or, on the skin and bronchial membrane, it promotes a diaphoresis, which, evaporating, tends further to abate the morbid heat of the system.

Several refrigerants may be beneficially added to the water thus administered. First, the vegetable acids, at all times acceptable to the patient, and in all countries found to exercise an effect on the heat of the body; second, certain neutral salts, such as the nitrate of potash, bicarbonate of potash, and the tartrate and bicarbonate of soda; third, demulcents, such as gum Arabic and elm bark, which, whether received internally, or applied to an inflamed part, seem to have the power of moderating temperature.*

All the measures which have been proposed concur in one effect, *reduction of*, not change, in the force of the morbid excitement. If we inquire for the therapeutic principle which unites the whole into a single group,

* For further remarks on this subject see vol. i. p. 806.

not find it in a diminution of the excitability of the system, but in duction of those agents denominated stimuli, including the blood, t which the vital susceptibilities can neither develop nor maintain in the functions of the organism. The effect produced is, indeed, the uebility of Brown. Under this treatment, the inflammation is often ed and the fever terminated; yet it so frequently fails, that recourse must be had to the means of fulfilling other indications, and this brings us to our second general head.*

II. To Change the Mode of Action.—Without insisting strenuously Hunter's incompatibility of action in the treatment of disease, we bring under this head several agents which deserve the name of antitic alterants. Their impr[illegible] the system supersedes, more or perfectly, the inflammatory acti[illegible], when the former dies away the does not revive. If their effects do not subside spontaneously, they but substitute one type of morb[illegible] action for another. Experience proves that it is a pre-requisite to their [illegible]ccessful administration, that the phlogistic excitement should not be very [illegible]igh; and thus their effects are generally much better after than without [illegible]loodletting. The neglect of this maxim, may indeed not merely nullify th[illegible]r benefits, but render them injurious. Yet some of them exert a sedati[illegible] not less than alterant influence, and therefore assist in fulfilling the [illegible]ng indication, while they are accomplishing the one now under c[illegible]eration. Even these, however, act more kindly, both as sedatives and alterants, after venesection. Another view which should be taken is that some direct their action more on one organ, others on another, which suggests a choice, that will if possible carry an alterant influence into the seat of the inflammation. Keeping these maxims in mind, let us proceed to consider the principal articles which belong to this head.

1. *Tartarized Antimony.*—This is one of our most potent antiphlogistic alterants; while it changes the type of action from the inflammatory to the antimonial it directly lowers the excitement. Thus it fulfils two indications. Its sedative, or rather its enfeebling influence on the heart and arteries, renders it a tolerable substitute for the lancet in the milder phlegmasiæ, and hence it may be given when the grade of inflammatory excitement precludes almost every other alterant. Still when the disease is intense it may fail in its characteristic effects, and even excite gastritis if blood be not abstracted; after which it may render repeated venesections unnecessary. It is impro-

* The method pursued by the Broussais school, for the cure of *phlegmasiæ*, including, in their estimation, all fevers, consisted in little else than what we have just enumerated. Thus it was still more *defective* than their pathology was *erroneous*; for admitting the latter, the remedies they proposed were by no means the whole which should be employed. The founder of the sect was a man of high talents; but his experience was subordinated to his genius, and his popularity was destroyed by his therapeutics: too active where, as often happened, no inflammation really existed, and too weak and simple when it was acute.

per only when the stomach and duodenum are inflamed, or in cases of peritonitis and hepatitis, which generate sympathetic gastric irritability. It acts better in mucous than serous inflammation, because it fulfils our fifth indication in promoting secretion, while in serous inflammation it is important to arrest that function. It is well adapted to inflammation of the skin and subjacent tissues, the white fibrous structures, the mucous membrane of the ileum and colon, the tonsils and pharynx, the larynx, the bronchial tubes, and the air cells and areolar tissue of the lungs, upon which it may be said most constantly to exert its power. In the phlegmasiæ of the heart and brain it has seemed to me less beneficial, but is not contraindicated. It co-operates well with calomel, opium, diuretics, and sudorifics, and thus on the whole is, I think, the most important antiphlogistic of our materia medica.

2. *Calomel.*—The alterant effects of this antiphlogistic are known to all the world. It irritates the stomach less than tartar emetic, in general not at all, and often quiets that organ when other means have failed. Hence it is well adapted to gastro-enteritis and inflammation of the liver, over which it exerts an alterative control, quite equal to that of tartar over the lungs. In the mucous inflammation of the ileum, cœcum and colon, it possesses no power beyond, if equal to, that of tartar. In the phlegmasiæ of the serous membranes we see its greatest triumphs. It has been said to effect these by diminishing the hyperinosis of the blood, but it produces that result by moderating the inflammation. Having what may almost be called a specific influence on the serous tissue it is equally applicable to peritonitis, pleurisy, pericarditis, endocarditis, arachnitis, iritis, and tracheitis, when the very simple mucous membrane of the trachea is throwing out a *quasi* coagulating lymph. On the secretions of the skin, lungs, and kidneys it exerts much less influence than tartarized antimony, on those of the liver and salivary glands more. Its reducent power over the high excitement of the brain and heart, is less than that of the medicine last named; but the constitutional diathesis (*morbus mercurialis*) which it sets up is more strongly characterized and enduring, and to this we may ascribe its greatest benefits. As a simple antiphlogistic alterant, its power is indeed very great, and so genial is its impress in simple acute inflammation of the serous and fibrous tissues, that it may be safely administered through their violent stages, in doses which would prove highly injurious in many other types of constitutional disease. Hence deleterious results from the abuse of this medicine are seldom found in the treatment of the acute phlegmasiæ.

3. *Digitalis, Squill, and Colchicum.*—Each of these medicines acts as an alterant in the phlegmasiæ, being able to impress the system in its own manner: which is one that tends to supersede the pre-existing morbid excitement. But their good effects do not arise wholly from this power, for (if bloodletting have preceded their use) they abate the action and diminish the

force of the heart, and thus fulfil our first indication, but in a different way from the means enumerated under that head, which consisted of the exclusion and abstraction of *stimuli*, while these agents diminish or obtund the vital properties of contractility and sensibility. Hence they contribute to the accomplishment of our third indication, allaying constitutional irritation. While they decidedly affect the innervation and circulation, they affect but few of the secretions; yet colchicum increases that of the bowels, and squill those of the lungs and kidneys. Digitalis and indeed the whole excite the absorbent system, and thus promote the early absorption of coagulating lymph. Considered in reference to the inflamed organ, digitalis is best adapted to the heart and lungs, especially the former, the squill to the bronchial membrane, and colchicum to the fibrous tissues. The squill acts harmoniously with calomel; digitalis with tartarized antimony, and colchicum with opium. There are other antiphlogistic alterants, but in these we have the types of the whole; and as the remainder are in general less reliable, I shall pass them by, and proceed to our next indication.

III. To ALLAY IRRITABILITY.—To reduce and change the morbid excitement are the great curative objects in the acute phlegmasiæ; but another less important and contingent end must be accomplished, both for the safety and the comfort of the patient. The bloodletting which cannot always be accurately adjusted to the demands of the case, and the other exclusions and abstractions of stimuli recommended under our first head, frequently develop a state of constitutional irritation, which, unattended to, prolongs the sufferings of the patient, and may sometimes prove fatal. The diagnosis of this condition, so well recognized by Sydenham, is often difficult, even to the experienced physician, who may imagine from the increased impetus of the heart, and the restlessness and complainings of the patient, that the original disease is on the increase, and thus redouble his efforts in the antiphlogistic treatment. A feeling of alarm and a sense of thoracic weight or constriction, coldness of the feet, increase of urine, and a dead-leaf hue, or the fur on the tongue, will, in general, characterize this incipient neurosis. Additional diagnostic aid may, however, be had from noticing the temperament of the patient, the lymphatic being that which most favors its development. Of all the phlegmasiæ those of the brain and liver are, I think, most apt to be accompanied by it. Opium (including its preparations), is the great remedy for this morbid innervation. It can be combined with the alterants which it may still be proper to administer, for the inflammation is not always subdued when this new type of action arises, or it may be given alone or with diaphoretics, when it aids in fulfilling the indication of restoring the suspended secretions. Carbonate of ammonia, camphor, and assafœtida, are also beneficial, but their effects are less certain and more transient than those of opium. When the physician feels assured that inflammation is reduced, alcoholic stimulants and food will be proper, and may even render opium, except at night, unnecessary.

other form of nervous irritation demands opium even in the earlier
of the inflammation. I refer to that of the heart, the stomach, and
s. When the first is inflamed, its violent convulsive action is but
moderated by copious depletion, and opium is required to reduce its
ility. It may be combined with calomel, digitalis, colchicum, or
ver alterant may be in use. In acute gastritis or peritonitis intesti-
the disordered peristaltic function often demands opium, even while
flammation is yet severe. The vomiting in many cases cannot be
ated without it, and while no appropriate alterant can be retained,
olent muscular contractions are torturing the inflamed mucous mem-
. In the bowels, various forms of spasmodic contraction may do harm
same way, and demand the administration of the same remedy, which
contraindicated by the constipation of the patient, but rather the
e, for cathartics will act more certainly and kindly after the spas-
action is abated than before.

annot leave this head without expressing, though not without hesita-
the opinion, that the full power of opium in the treatment of the simple
masiæ, has not been developed. That medicine is an alterant not less
narcotic. It produces its peculiar morbid diathesis, both acute and
ic. A large part of the alterative effect is found in that reduction of
ontractility and sensibility which constitutes the object of the indica-
e are now studying. Now what is more likely to *eradicate* both in-
ation and its accompanying fever, than diminishing those vital sus-
ilities, without an exaltation or perversion of which no inflammation
rise? To administer opium before bloodletting, when the action of
eart is powerful, is to increase the excitement, but immediately after
enesection its effects are so entirely different, that I have often ques-
l with myself whether the physician who might be deprived of other
ies, could not by these alone subdue all the phlegmasiæ except those
brain?

. To EQUALIZE THE EXCITEMENT.—Under this head fall all counter-
nts and other revulsives. Their successful employment calls for two
ations: *first*, to reduce the general excitement before resorting to
especially counter-irritants; *second*, always to make the revulsion to
an or surface of less importance in the economy than the one inflamed.
ntion to the first of these rules has inflicted on patients an immense
nt of suffering without any benefits. While the bloodvessels are full,
art strong in its action, and the nervous system highly excited, to say
g of the state of the inflamed part, revulsion cannot be effected. A
flammation may be induced, but the system can and does resist it,
and that the more certainly because the second acts as a stimulant to
here is an apparent exception, but it confirms the rule. In the [illegible]
ge of the inflammation and before the constitutional excitement has
or acquired much intensity, a large counter-irritant is sometimes [illegible]

by an arrest of the local disease; but after its full development the is entirely different. Counter-irritants appear to relieve inflammay inviting nervous force and blood into a new part with which the d stands in anatomical or physiological relation, when the energies of rvation and circulation are so reduced that they cannot well supply two ıds, and, therefore, on the rise, under a new cause, of the second y orgasm, the first dies away. But without attaching any importance speculation, we may say that the practice which it demands is that the ablest physicians have found most successful. I lately heard a read,* in which the author argued that it was by drawing off coagu- lymph from the neighborhood of the inflamed part that blisters were al. That the vesicles in th tate of the system often show the ence of the fibrinous element blood is well known; but this is sumciently explained by the hyperinosis of the blood, which I regard as the effect and not the cause of the inflammation.

Two classes of patients do not bear the liberal and protracted application of blisters, they are persons, especially women, of a nervo-lymphatic temperament, and small children with delicate skins. In the former, the blistered surface sometimes becomes the seat of an intolerable nervous irritation; and, therefore, rubefacients more transient in their effects are generally to be preferred. In the latter, an unfavorable irritation is in some instances carried through the nervous system, and the blistered surface now and then becomes gangrenous. The blister should therefore be removed on the first appearance of vesication, and an emollient poultice applied; a practice which has become much commoner in latter than it was in former years.

Revulsion may be effected without counter-irritation, and in many cases to a much greater extent. Thus a long-continued and rather hot foot-bath will make greater revulsion from the head than a pair of blisters above the ankles, or rubefacients to the soles, though it will be less permanent; and moderately stimulating emollient poultices or fomentations over the abdomen in peritonitis, will often accomplish as much as blisters, while they contribute to allay the spasmodic action within, and thus aid in the fulfilment of another indication. Purging is another and powerful means of revulsion. In this cause it is increased secretory action which invites blood to the part and expends nervous force. A great portion of the benefit of purging in the phlegmasiæ is thus obtained. Thus, in gastritis, when the bowels can be brought to secrete and excrete freely, the stomach becomes more composed; and the condition is beneficial in the same manner in peritonitis, hepatitis, and splenitis, especially when not connected with autumnal fever. In these cases the blood is not accumulated in the intestinal membrane, but supplies the material for increased secretion; and the benefits of topical depletion are obtained with those of revulsion. To this end, the hydrogogue cathartics are best adapted. By a parity of reasoning we per-

* By Dr. Thomas Wood, before the Med. Chir. Society of Cincinnati.

ceive how cholagogues relieve the liver and all the portal viscera, and that they should not be neglected. This method of revulsion is not without its benefits in the phlegmasiæ of the heart, but in those of the lungs it has not been found expedient, the reason of which seems to be that the natural cure of pulmonary inflammation is by expectoration; and that as two great secreting organs cannot well be in a state of excited function at the same time, that of the lungs is retarded or suspended by that of the bowels. If, however, purgative revulsion is useless or injurious, when the pulmonary organs are the seat of inflammation, it is very different when the brain and spinal cord are affected. In every variety of acute cerebral inflammation, the revulsion effected by free purgation is of inestimable value. The heaviness, headache, and sometimes vertigo attendant on costiveness, with the immediate relief produced by free alvine evacuation; and the extreme though transient debility which occasionally follows on a sudden and copious discharge from the bowels, instruct us on the physiological relation between those organs and the brain; and might have been sufficient to suggest the remedy which an ample experience has so decidedly approved. Lastly, purging makes revulsion from the joints and fibrous tissues of the limbs and also from the skin and areolar tissue beneath. This marked introversion of the blood and nervous force, which every physician has so often witnessed, abates morbid function in the organs which have been named, and brings out beneficial results in the inflammations consequent on external violence, in rheumatism, in phlegmon, and in scarlatina, and certain cases of erysipelas.

In conclusion, I may speak of revulsion the very opposite of the last. Sudorifics impart a centrifugal direction to the capillary circulation, and the nervous energy which is expended in the functions of which they are the incitors. When the vessels of the skin are made to receive a large quantity of blood, the viscera, of course, circulate less, and the remains of inflammatory hyperæmia may be carried off. In this case, the revulsion is made from more to less vital parts, and can never do mischief, though the efforts to effect it when the excitement of the system is too high, may not merely fail, but prove injurious. The measures requisite to this revulsion deserve a paragraph. They are, in general, most efficacious immediately after venesection, or purging, the latter having ceased. They should be brought to bear on the system at night, and a certain degree of narcotism greatly favors the desired result.

Again, posture is in many cases an efficient revulsive, giving to that word its most extensive signification. Thus, if the inflammation be in the brain, an erect position mitigates, while a horizontal aggravates it; if in the hand or foot, hanging down increases the hyperæmia and pain; while elevation into an unnatural position in reference to the heart, diminishes the momentum of the circulation, and works out the effect of powerful revulsion.

V. To Promote or Restore the Suspended or Depraved Secre-

—As we all know, the secretions do not remain normal in the phleg- Seldom increased, they are generally diminished, and always de- ed in character. This state of the secretory functions, the effect and e cause of the fever and the inflammation, generally ceases when they ested, and cannot, to any great extent, be corrected while they con- especially the fever. But we may sometimes re-establish a secretion during the phlogistic condition of the system, and make it a physiological remedy. Facts, bearing on this point, have been mentioned under some of ceding heads. Thus, increased secretion co-operates with bloodlet- the work of general, with cupping in that of local depletion; while agmented supplies of blood and nervous influence extended to an organ ate of excited function, makes derivation or revulsion from that which named. The means, appropriate to the indication we are now consider- ave likewise been glanced at in seve al places. Thus, tartarized anti- ipecac., squill, lobelia inflata, pe gala senega, and the sanguinaria c aensis, with diluents, mucilages, an gentle opiates, increase the secre- tion from the bronchial membrane, a carry off pulmonary congestion. Minute doses of the first two medicines. infusions of eupatorium perfolia- tum, sage, orange leaves, and other si le diaphoretics, with sulphate of morphine, or Dover's powder, aided with tepid foot-bathing, act also on the pulmonary mucous membrane, but are here presented as sudorifics; and when they succeed, it is with an attendant, outward direction of the cur- rents of the circulation, whereby internal hyperæmias, and, above all, those of the lungs, are diminished. The urinary secretion—antagonistic to the perspiratory—may be augmented by the cool operative diuretics, nitrate and bitartrate of potash being the best; by squill, combined with nitre, and by the spirit of nitrous ether, taken in cold diuretic infusions, with an exclusion of whatever might determine their action upon the skin. The diuresis, thus excited, cannot be said, on anatomical grounds, to make revulsion from any particular organ, but it rids the blood of those elements which it is the function of the kidneys to eliminate from the system; and by exciting the absorbents, promotes the absorption while it is yet fluid, of the coagulating lymph, which is thrown out by the inflamed vessels. When the inflammation is seated in the lungs, and life is threatened by the impaired decarbonization of the blood, an increased secretion of urine, by carrying off carbon, the largest element of the extractive matters of that fluid, may be found beneficial.* Whatever value may be granted to this operation, experience has shown that in pulmonary inflammation the administration of certain diuretics is beneficial, yet as they are also expectorants, the greater part of their benefit may arise from their action on the lungs. When the inflammation has its seat in the brain, it is also peculiarly proper to augment the secretion of the kidneys, and prevent accumulations of urea and uric acid in the blood, which observation has taught us act perniciously on the cerebral organ. In speaking

* See Simon's Chem. of Man, Am. Ed. p. 429, in a note.

of hydrogogue and cholagogue cathartics as a means of revulsion and of depletion from the abdominial organs, but little was left for introduction here. A greatly reduced activity of the portal secretions is a common pathological condition in the phlegmasiæ, and the necessity of re-exciting them while the fever is still unreduced, is often urgent. The liquor intestinalis is frequently secreted when the bile is not, rarely the reverse. It has not been found beneficial to promote the former and neglect the latter; but when the liver acts freely, the mucous membrane may be quickened into increased secretion with good effect. The most efficient agents for fulfilling these indications, are calomel (in preference to the blue pill), tartarized antimony in small doses, sulphate of magnesia in combination with the last, or dissolved in senna-infusion, elaterium with bitartrate of potash, and lastly the compound powder of jalap.

In these various attempts to quicken the inactive or suspended organs of secretion, we must never forget that they should not be entered upon, till the arterial excitement has been moderated by bloodletting and other direct debilitants. When the fever has been subdued, it sometimes happens that some great secretory function—that of the skin, the lungs, kidneys, liver, or bowels, will remain comparatively inactive. In such a case the convalescence will be slow. This sometimes depends on chronic inflammation, at other times on simple torpidity; and the means of restoration must vary accordingly. Of the whole, the functions of the skin and liver are oftenest found in this condition, from which they are best relieved by stimulating diaphoretics and cholagogues. And this brings us, naturally, to our last general indication of cure.

VI. To repair the Waste and restore the Strength of the Tissues.—With the resolution of the inflammation and the cessation of the fever, the abnormal production of fibrine no doubt ceases, but the last bleeding, which might have immediately preceded these events, very often shows a hyperinosis or excess of fibrine. Now, is this fibrine in that state of degradation which requires its elimination from the system? I presume not; for it has not been detected in the excretions of convalescence; and up to the close, it is capable of becoming organized in the tissues among which it is secreted. We may then assume that it is immediately appropriated to the repair of the organism until it is brought down to the normal quantity. Thus, while the system is generating plastic material with which to repair the anatomical injury that a part may have suffered from without, it is at the same time providing a highly animalized food for the hungry organs, and as soon as the morbid action is terminated, nutrition recommences with an activity unknown under other circumstances. Thus, we can comprehend how it is that in the phlegmasia, patients often recover strength rapidly, before they are permitted to take food, and, in general, require fewer stimulants to help them on than any other class of convalescents. This internal storehouse is, however, soon exhausted; and a supply of aliment from with-

paroxysms of nervous irritation, which equally prevent both sleep and perspiration, and are imperative calls for some preparation of opium.

VII. I must not dismiss this branch of our subject without referring to two or three additional pathological conditions, which may either occasion a tardy convalescence, or arrest it by the formation of a new disease.

First. I have already referred to the sinking of an acute into a chronic inflammation. The blaze is extinguished, but the smouldering embers remain, and although they may never flare up, the slow destruction of the tissues is not less certain. In former times, such cases were vaguely denominated chronic diseases, and we owe to the keen penetration of Broussais the first good account of their real character. The diagnosis of the acute phlegmasiæ is simple compared with that of the chronic, which so often seem like neuralgias or mere functional imperfections, and, therefore, they should fix the attention of every physician.

Second. After one of the phlogistic fevers occurring about the age of puberty, especially in females, the blood is left in a state of spanæmia or deficiency in its solid elements, particularly the ferruginous. This chlorotic condition arrests convalescence, and, if not corrected, may generate hydropic effusions, or certain neurotic affections, according to the predisposition of different patients. The appropriate remedies are chalybeates, nourishing diet, and exercise in the open air.

Third. Patients of a tubercular diathesis, either pulmonary or lymphatic, are in danger of having it augmented by the depletions and other enervating agencies to which they have been subjected, and may thus fall victims to a second disease, hastened into full development by the means which had saved their lives in a first. To prevent such a sinister result, we must have respect to the existence of a tuberculous diathesis while treating the acute phlegmasiæ, and substitute, as far as possible, other curative means for bloodletting, and the free use of mercury, while, to effect a complete restoration, often impossible, we must, during convalescence, administer the bark, iodide of iron, and other tonics, while much active exercise in the open air, together with a generous diet, is enjoined.

This therapeutic summary finishes our survey of the etiology, pathology, and treatment of the phlegmasiæ or phlogistic fevers, taken as a natural family, or group. I must here repeat that it is not given as an *elementary* treatise on inflammation, with its attendant fever, which would not accord with the objects of a regional, historical, and practical work, and to which, moreover, from its imperfections, it could have no just claim; but is intended merely as a generic presentation of facts and principles, almost equally applicable to all the species of phlogistic fever, and although it has postponed their introduction, we shall, I think, complete their history in less time than if views common to the whole had not been taken. Their generic etiology, pathology, diagnosis, and the indications and means of cure being understood, the respective specific histories will be much simplified and shortened.

CHAPTER VI.

EGMASLÆ OF THE CENTRAL ORGANS OF INNERVATION, BRAIN, AND SPINAL CORD, WITH THEIR MEMBRANES.

SECTION I.

ANATOMICO-PHYSIOLOGICAL INTRODUCTION.

E may recognize the following as anatomico-physiological laws of the phalic circulation :—

w I.—The cranium is a bony case, which, in the adult, is not perme- by air, nor compressible under atmospheric pressure, nor extensible the power of the heart exercised through the arteries carrying the blood.

Law II.—The brain is composed of bro-cellular substance, which consists of eighty parts in one hundred of water, and twenty of fatty and other animal matters, incompressible under th action of the heart; for, 1st, if the whole force of that organ could be exerted upon those substances it could not compress them; and, 2dly, t force is not so directed, but exhausted in impelling the blood *through* the brain.

Law III.—The blood itself is incompressible by any forces employed in sustaining its circulation.

Law IV.—It follows, logically, that the integrity of the brain and cranium continuing, there can be neither increase nor decrease in the quantity of blood in the former.

Law V.—There is a rate of velocity of circulation through the brain which is most proper—normal—favorable to the functions of the brain. It may be greatly reduced, or greatly increased, without the absolute quantity of blood varying.

Law VI.—Although there can be no more blood in the brain at one time than another, much more may pass through that organ in a given time than in another given time of the same length, and hence the brain, in one period, may be more acted upon by arterial blood than in another equal period, notwithstanding it never has in it more or less than a given quantity.

Law VII.—The concussion which the blood imparts to the brain is diminished and increased within physiological limits by several circumstances :—diminished by a languid contraction of the heart; increased by augmented force of contraction in the heart, by the head being placed lower than the heart, whereby gravitation retards the return of blood from the brain, and augments the momentum of that going to the brain. Horizontal gyration, with the head in a peripheral direction, produces the same effect; as the centrifugal force resists the return of blood from the brain, and accelerates the flow of that which the heart is directing to it.

Law VIII.—There should be a certain relation between the arterial and venous blood in the brain. This relation may be violated, and the violation may be at the expense of the venous, or of the arterial blood. An excess of one, and a defect of the other, must, of necessity, arise simultaneously; for as one class of vessels becomes more turgid, the other must become more contracted.

Law IX.—It results, from what is here said, that the whole venous system of the brain may be in a state of congestion, and that the whole arterial system may be in the same state; but not at the same time. In the former case, the brain is affected by the impress of venous blood, which reduces its functions; in the latter by arterial blood, which exalts them. In both there is retarded or impeded circulation from one class of vessels into the other.

Law X.—But although there cannot be universal venous and arterial congestion at the same time, which would imply an increase in the absolute quantity of blood, there may be an increase of both in a particular part of the brain. This local hyperæmia, which exists in every case of encephalitis, is necessarily attended with a tendency to anæmia in some other part of the brain. There is no destruction of the balance between arterial and venous blood; but a disruption of the equilibrium of distribution.*

SECTION II.

CONGESTION OF THE BRAIN.

Everybody is familiar with the phrase "congestion of the brain," or "congestion of the head," which to popular apprehension (both in and out of the profession) expresses an excessive quantity of blood within the cranium, to which they are wont to ascribe the sinister effects. I propose to devote a section to these alleged congestions, not going beyond those which present themselves in our own country, though borrowing from others certain facts for this illustration. Such a section is in fact a proper introduction to inflammations of the brain; while it affords a suitable head under which to arrange a number of miscellaneous affections, which concur in presenting a transient non-inflammatory disturbance of the functions of the brain, more or less intense, as the prominent condition. Our leading

* [The progress of experimental physiology has rendered it necessary that some of the above positions of the lamented author should be modified. It may be advanced, that even when the amount of blood in the vessels of the brain is unchanged, the pressure upon their walls may vary considerably. Moreover the quantity of cerebro-spinal fluid is variable, and this taken together with the softness of the cerebral substance, would admit of considerable variations in the quantity of blood contained in the cerebral vessels—variations necessary, as it would seem, to the ever-changing functional activity of the cranial viscus, or at least bearing a direct relation to that activity. Indeed it will be found that the author himself, in the next chapter, leans to this view of the case, and even mentions experiments of his own as corroborating it.—Ed.]

[illegible] extent to which this disturbanc
[illegible] encephalic organs.

PHLEGMASIÆ OF THE [illegible] indicative of this congestion are vertig
AND SPIN[illegible] of sight, dull headache, sense
[illegible] of the longitudinal sinus, dulness
[illegible] dusk of the face, constipation, and col
[illegible] coma, difficult articulation, numbness
[illegible] sensibility, apoplexy, paralysis, and death
[illegible] exceedingly various.

We may recognise [illegible] productive of these symptoms, and consti
encephalic circulation [illegible] kinds of cerebral congestion, there are several of

Law I.—[illegible] which are external or even physiological.
able by air, [illegible] vertigo and momentary blindness on stooping or any
under the [illegible] heaviness in the head and lethargy, the occasional
blood. [illegible] in men, and hysteria in women, promptly relieved

Law V. [illegible] plethora, seem to indicate cerebral congestion as a
[illegible] condition of the bloodvessels, and a cause of the
[illegible] brain. We must bear in mind, however, that
[illegible] that the fibrine of the blood in plethora is reduced
[illegible] red corpscules are increased in about the same
[illegible] we adopt the conclusion that the phenomena just
[illegible] entirely on congestion of the brain, we must consider
[illegible] effect on the functions of that organ, of the presence in
[illegible] blood. The most common remote causes of plethora are,
[illegible] excessive exercise, and protracted sleep, with a constitution
[illegible] nutrition. It is obvious that these violations of hygienic law
[illegible] enter into the innervation, as well as augment the quantity of
[illegible] another reason for not ascribing all the morbid phenomena to con-
[illegible] congestion is more apt to be followed by apoplexy than cere-
[illegible] temperaments are peculiarly in danger of a serious lesion of the
[illegible] a full meal, alcoholic indulgence, strong coffee, opium, costive-
[illegible] muscular effort, and intense passion or emotion.

[illegible] bleeding and purging are the immediate and indispensable means
[illegible] the worst signs of cerebral congestion show themselves in the ple-
[illegible] This treatment will not, however, permanently obviate the plethora,
[illegible] frequently repeated to the neglect of other means, will increase the
[illegible] congestion of the brain. A great but gradual reduction of
[illegible] quantity of food, and free and even laborious exercise in the open
[illegible] are appropriate remedies; to which may be added the means of
[illegible] constipation, without which all others will fail.

[illegible] In this state of the system there is not only reduction of
the relative mass of blood below the normal quantity, but a disproportionate
[illegible] between the fibrine and the red corpuscles, with a consequent predominance

* Essay, p. 39–41.

of serum.* Co-existing with this condition of the blood, there is an enfeebled state of the vital powers, and morbid sensibility and irritability of the whole system, especially the brain and heart. In this pathological state, congestions of the brain—so called—are even more common than in its opposite general hyperæmia or plethora. But why should this be the case? A reduced quantity of watery blood should certainly find its way through the brain. We cannot, I think, refuse to believe that whatever congestions of the brain occur in this condition, are consequent upon the morbid state of the cerebral tissue, and that while some of the symptoms may be referred to irregularities of the cerebral circulation, others, not less than those irregularities themselves, are to be ascribed to the altered sensibility of the brain and nervous system, and the impress on them of an altered and impoverished blood. Vertigo, throbbing, tinnitus, momentary blindness, and transient hysteria, apoplexy and palsy, characterize this diathesis; which may be the result of a variety of causes, of which the greatest are excessive or long-continued alvine evacuation, *secundum artem*, or hemorrhage. In the paroxysms of cerebral disorder consequent on this condition, the patient may in general be restored by stimulation of the skin, Schneiderian membrane, and rectum, with a moderate exhibition of diffusible stimulants and narcotics. To remove the general diathesis, regard must be had to the cause which produced it, which, if still existing, should be obviated. After that, a nourishing diet, exercise, fresh air, the alternate affusion of hot and cold water, with subsequent frictions, vegetable bitters, aperients, and chalybeates.

3. *Organic affections of the heart* generate the symptoms of cerebral congestion. Loss of receiving power in the right cavities of that organ must generate venous congestion, and disproportionately increased force in the contractions of the left ventricle may create arterial congestion. Such congestions depend on mechanical causes, and cannot occur simultaneously, unless the powers which originate them are capable of pressing the cerebral substance into a smaller place, and filling its place with blood—of which, as we have seen, there is no sufficient proof. A turgescence of either class of vessels, necessarily produces several pathological effects.

1. Pressure on the cerebral substance in contact with those vessels, with displacement proportionate to their increased diameters. This displacement is necessarily at the expense of the calibres of the vessels in the neighboring parts. Now, this condition may be suddenly induced, and we cannot doubt that many of the symptoms of congestion may be thus generated.

2. A congestion of the kind we are now considering must necessarily retard the circulation through the brain. This is the violation of a physiological law, and cannot but contribute to the production of some of what are called the effects of congestion.

* Andral's Essay.

"that he imagined he had been gone several days," and believed the camp to be the same he had left. In both cases this delirium passed away from increase of heat and nourishment.

When the brain has been examined after death from starvation, it has been found more vascular than other parts of the body; it has even been pronounced to be in a state of inflammatory congestion, and the ventricles have sometimes contained serum beyond the usual quantities. But in these cases, we are not at liberty to doubt that the disturbance of the functions was referable to the state of the cerebral substance, independent of congestion. That the organ should appear to be in a state of congestion is not remarkable, seeing that the pressure of the atmosphere must of necessity keep blood enough in the cranium to prevent a vacuum; but if we grant a congestion not to be thus explained it must be ascribed to the previous condition of the cerebral substance, and classed with the pathological effects rather than causes.

8. *Solar Heat.*—Sun-stroke or coup de soleil is generally believed to consist essentially in cerebral congestion. Andral* has given two cases in which there was not in fact congestion of the brain, though they are presented as examples of that disease. Dr. Dowler, of New Orleans, where death from insolation is not uncommon, denies the existence of congestion of the brain, but affirms that the cause of death is to be found in congestion of the lungs. Nevertheless the phenomena of this affection are those of cerebral diseases, and no doubt there is sometimes congestion of the brain, sometimes of the lungs, or even of other organs. But why should we ascribe the death of the individual to this congestion, and overlook the antecedent circumstances? The experiments of Dr. Edwards,† show that animals drowned in warm or hot water cannot be revived like those who had been submerged in cold water, for the same length of time. Also that frogs which may live twenty-four hours in water but little above the freezing point, die in a few minutes if submerged in that which has a temperature eight or ten degrees above the freezing point. These and other facts show that heat tends to exhaust the irritability and sensibility of the organs, and to this we must ascribe much of the sinister influence of insolation. The same and other experimenters‡ have shown that before death takes place from exposure to a hot atmosphere, the bodies of the mammalia and birds may be raised in temperature 10° or 12°. It cannot be denied then, that some increase of heat must take place in both the blood and solids of the body, in those who move in our summer atmosphere exposed to the sun, which must disturb their functions. That congestions of the brain and other organs may be generated under this powerful action of caloric, is not remarkable; but we are not at liberty to overlook the pathological circumstances which precede them, and of which they are but the effects.

* Clin. Med. p. 75. † Influence of Phys. Agents on Life. ‡ Miller's and Carpenter's Phys.

of course depend on a previous state of that part of the brain in which it occurs. If the narcotic draught should be large or greatly concentrated, this primary effect on the brain may prove immediately fatal without the intervention of congestion. Such is the effect of prussic acid. The same is true of alcohol. Thus, Dr. Frederick Ridgely, of Lexington, informed me that he once saw a man who had so far recovered from a fever as to be able to walk about, drink half a pint of whiskey, and fall down dead. Indeed, the whole therapeutical and toxicological history of narcotics proves that they exert a powerful and deleterious impress on the brain, of which, when death does not immediately occur, congestion may be the consequence. The hydraulic theory diverts our attention from the former—the primary, and fixes it on the latter, which is but secondary.

6. *Gastric Repletion.*—The effect of this on the brain is established by the general experience of mankind. It is a physiological law that an extravagantly large meal shall affect both the heart and brain. In the production of congestion in the latter, it sympathetically disturbs or depresses the cerebral tissues, while the heart, increased in its energy, propels the blood with augmented momentum. The drowsiness and every other sinister cerebral symptom in this case is commonly ascribed to congestion; but it is worthy of remark, that there are two periods in the twenty-four hours in which such a meal is not followed by drowsiness, and two in which it is. A hearty breakfast, and a hearty supper taken at nightfall, are not productive of stupor and sleep, but taken soon after mid-day or late in the evening, the propensity to sleep is often urgent, and serious lesions of the brain sometimes occur in that state. Now as the dynamic influence of the heart over the brain should be the same after each of the four meals, it would appear that some other pathological cause is in operation, and that the danger does not consist altogether in the injection of the brain.

7. *Abstinence.*—Starvation, while it constantly diminishes the quantity of blood, and reduces the power of the heart, is well known to generate cerebral symptoms identical with many of those ascribed to congestion, such as vertigo, headache, delirium, mania, convulsions, and even apoplexy.* Captain Fremont† informs us, that in the month of February, 1844, when his party was crossing the Sierra Nevada, in North California, at the average height of 9,000 feet, in latitude 38°–9°, after many days of fatigue, exposure to cold, and a diet reduced almost to famine, Towns, one of his men, "became light-headed, and wandered off into the woods, not knowing where he was going." Three days afterwards, when they had descended to the banks of a small icy river, he went in to swim as if it had been summer. About the same time, Derosier, another man, was separated from the party on a special duty, and wandered, cold, hungry, and fatigued, for forty-eight hours. He overtook the party, and still was in such a mental condition,

* Cyclop. of Prac. Med. vol. i. p. 22.
† Explor. Exped. to Oregon and California, 1843–4, p. 240.

"that he imagined he had been gone several days," and believed t' to be the same he had left. In both cases this delirium passed av increase of heat and nourishment.

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ither
ns, how-
er a single

NUAL AVERAGE
RETURNS BEING FOR

[illegible]	[illegible]	7·1	24·6
[illegible]	[illegible]	8·0	30·4
[illegible]	[illegible]	20·5	74·3

[illegible] diseases of the brain and [illegible] are most prevalent in the South, [illegible] middle latitudes; the number [illegible] the northern ports; 24·6 in [illegible] the northern differs so little

*Clin. Med. p. 76. † In[illegible] ‡ Clin. Med. p. 77.

from the middle latitudes, we may say that the heat of the South seems more productive of cerebral disease than the cold of the North. In comparing the numbers which express the relative liability of the different quarters of the calendar year, we find those of the middle latitudes remarkably uniform; those of the North do not indicate the sinister influence of winter in any striking degree; but those of the South show decisively the influence of summer. If we add up the averages of each quarter, for all the posts extending from Key West to Fort Brady, through 22° of latitude, the results are,—1st quarter, 31·6; 2d quarter, 34·1; 3d quarter, 38·3; 4th quarter, 35·6. Thus, the third quarter, embracing July and August, presents the greatest number; the first quarter, comprehending January and February, the least; while the spring and fall, or the second and fourth, are nearly equal. These results, it will be seen, are at variance with those of Andral. No close comparison can, however, be drawn, for his observations were made in civil society, while the army returns exclude women, children, and aged men. Nevertheless, they are not without their value, as they show the influence of diversity of climate on a particular class of men, who, in everything else, are placed under similar hygienic circumstances.

It is a current opinion in this country, that extreme cold is apt to be fatal to aged persons, by inducing congestion of the brain, ending in apoplexy. This may be admitted without impeaching the accuracy of the army returns, inasmuch as the service excludes old men. A nutritious diet, taking care not to overload the stomach at night, open bowels, warm clothing, and especially the proper clothing of the head and lower extremities, are the best means of averting this sinister effect.

10. *Mental Excitement.*—Under this head may be included not only the inordinate exercise of the intellectual faculties, but all intense or protracted emotion or passion. The whole exert an influence on the brain and the circulation of blood through it. Every physiologist knows that when an organ is roused into functional activity, it receives and circulates more than its ordinary quantity of arterial blood, and that by over stimulation it may at length become inflamed. Now, this is not more true of the stomach, when subjected to repletion with its appropriate stimuli, food and drinks, than it is of the brain, when overworked or agitated by intellectual or emotional excitement. Thus an intense exercise of the mind in childhood may carry an irritation into the hemispheres of the brain, accompanied by congestion, and at length occasion hydrocephalic inflammation, or convulsions. Many precocious and promising children have been destroyed in this way. At a more advanced period, too much application, which, however, is not common among *our* young men, produces similar effects. In the meridian, and throughout the decline of life, great occasional exertion of mind is followed by apoplexy or cerebritis from congestion. This is, perhaps, oftenest

the case in those who in early manhood were dyspeptic. An illustration of this variety of cerebral congestion may be found in the following

CASE.—A physician, in one of the towns of the interior, was dyspeptic from the age of twenty-one to thirty-three or four, when the paroxyms of that malady began to diminish in force and frequency. At the age of thirty-nine, he was called upon for six or eight weeks to make a great and unwonted effort of mind; at the end of which time he felt an unnatural propensity for locomotion, and found it rather difficult to compose himself to sound sleep at his usual bedtime. On relaxing in his application of mind, these effects underwent some abatement; but through the remainder of the winter and the ensuing spring, he often felt a sense of weight or oppression in the upper part of the head. With the access of hot weather this feeling increased until it became almost constant, and was often accompanied with drowsiness or high mental excitement, his scalp frequently felt as if shrunk up and contracted over the cranium, and his feet seemed to him to be the seat of an acrid heat, when, in fact, they were too cool. Always prone to constipation, his bowels were now more torpid than usual; but his appetite was regular, his pulse was nearly natural, and he did not experience fever. In the latter part of June the cerebral symptoms increased in urgency, and a dull pain ensued, with great sense of tightness about the head, a loquacious propensity, and a strength and vividness of mind, which he had scarcely ever before displayed. He had taken a cathartic which did not operate, and it was now judged advisable to draw blood. This was done from a large orifice, the patient sitting up, and the discharge was allowed to continue until he felt the approach of syncope, which was averted by his lying down. The quantity drawn was forty-two ounces. It was not sizy. I need not, for our present purpose, go into minute details of the subsequent symptoms and treatment. This first bleeding was followed by a decided abatement of the cerebral symptoms, and a better operation of the cathartic medicines. But although the symptoms of actual cerebritis or meningitis were never developed, feelings of oppression, weight, and constriction continued to recur, and were combated by venesection, cupping, arteriotomy in the temple, till about one hundred ounces in all were lost, by cold applications, and then blisters to the head, and by repeated cathartics. At length there arose a state of constitutional exhaustion, accompanied by feelings of nervous irritation, demanding stimulants, tonics, nutrients, and exercise, under which he recovered a tolerable state of health. He remained subject, however, to attacks of a kind similar to, but less violent than the one described, for several years. In the more severe, he lost blood, which was never sizy, and almost always followed by a sense of deep nervous exhaustion, requiring diffusible stimuli and narcotics for its removal. Gradually he ceased to employ the lancet, and in general could arrest the attack by an early resort to active cathartics. But although more than twenty years have elapsed since the first attack, he is still subject to a feeling of weight and oppression in the region of the longitudinal

sinus, with drowsiness, especially in the afternoon, even when he has eaten no dinner, though both are augmented by that meal.

This seems to have been a case of cerebral congestion, which neglected, might have terminated either in apoplexy or inflammation. That it arose from over-working of the brain, previously rendered irregular in its circulation from sympathy with a dyspeptic stomach, is extremely probable. The temperament of this gentleman was of a kind to defend him against inflammation, and his age and anatomical conformation were an equal protection against apoplexy.

CHAPTER VII.

PHLEGMASIÆ OF THE CENTRAL ORGANS OF INNERVATION, BRAIN, AND SPINAL CORD, WITH THEIR MEMBRANES.

SECTION I.

PREVALENCE AND CAUSES.

1. It would be interesting to ascertain the comparative prevalence of original simple inflammation in the organs of the cranium, thorax, and abdomen, in the different parts of our Valley; but in the present, scarcely germinal condition of our vital statistics, such a comparison is impossible. Leaving the thoracic and abdominal inflammation for their appropriate heads, I may say in general terms that the cerebral are of much less frequent occurrence, but of more fatal issue than either of them. This, if I am not mistaken, is according to the experience of our physicians, and in comparing the number of deaths with the number of cases in the British army in Canada, and the Windward and Leeward (West India) Islands* I find it confirmed. Thus, through twenty years, there was one death for thirty cases of thoracic, eleven cases of abdominal, and nine cases of cephalic inflammation. These returns relate to men, but from the known mortality of cerebral inflammation in children, if a proportionate number of their attacks had been included, the rate of mortality would be still higher. We should not refer the dangerous character of cerebral inflammation to the causes which produce it, but to the anatomical and physiological peculiarities of the brain, to which reference will be made hereafter.

While thoracic inflammations prevail more in the North, and abdominal in the South, the cerebral appear to occur with considerable uniformity in all our latitudes; showing, that of the whole they have least connection with

* Tulloch's Report.

climate. My own observations lead to the conclusion that they are more frequent in town than country; but as the *supposed* causes abound in the former more than the latter, the mind is of course busied in favor of a conclusion, which, until established by statistics, should not be regarded as final. These causes were so fully enumerated and discussed in Chapter II., on the etiology of the phlegmasiæ generally, that little need be said in this place.

Gluttony and drinking may be either predisposing or exciting causes of cerebral inflammation. The former is, I think, an unquestionable cause of the disease in children who take but little exercise. In youth and manhood, either or both exert a pernicious influence. In old age, they generate apoplexy and palsy rather than inflammation. Undisciplined passions and intense or protracted study co-operate with the causes which have been named, and may even of themselves respectively excite inflammation. Falls and blows producing concussion of the brain or spinal cord, are effective causes, which prevail on land and water, in city and country, and are everywhere increasing with the eager extension of our business and new settlements; in which the forest is to be supplanted with the products of art, by a people who look much more to success in their enterprises than to the safety of their persons.

But sedentary employments and bodily inactivity may indirectly produce cerebral inflammation; for as muscular exertion invites blood into the extremities, and promotes its transit through the brain, the neglect of such exercise may favor congestion of that organ. Sedentary occupations, moreover, lead to costiveness, which, however, brought on, predisposes to cerebral hyperæmia and subsequent inflammation.

As several of the causes which have been named are rather increasing than diminishing, cerebral inflammation is likely to become more frequent than at present, and should therefore receive a careful consideration.

2. What has been said relates to cerebral inflammation as a primary affection, but we must not forget that it is still oftener a secondary disease.

1. It is frequently developed, as we have seen, in the course of our typhous, exanthematous, erysipelatous, *yellow*, and autumnal remittent fevers, when it generally proves fatal.

2. In the form of duramatritis it occurs as a metastasis of rheumatism from the joints; a more manageable case than those just mentioned.

3. Active or excentric hypertrophy of the heart, by over injecting the brain, frequently originates inflammation.

4. In advanced stages of phthisis it is not uncommon; and I have seen a fatal case which supervened on extensive tuberculization of the lungs, before the suppurative stage had set in. In these cases there is doubtless a deposit of tubercles in the brain; and they may be classed with the cases of original tubercular cerebritis (or incurable hydrocephalus) of children.

5. I have seen many metastases of inflammatory cholera infantum to the

brain. It seems probable that the organ was tubercular; for they have generally proved refractory and fatal. Sometimes they begin almost as soon as the gastric affection. In other cases they arise insidiously and slowly, the cholera having become chronic. I have not seen the cholera morbus of adults undergo this metastasis.

6. The cerebritis following on the collapse of epidemic cholera, is but too well known to us all.

7. Apoplexy is often followed by inflammation, especially when hemiplegia has been induced; and its superadded lesions are doubtless one of the causes which render the latter infirmity protracted, and occasion the imbecility so often associated with it.

8. Inflammation of the dura mater and its associated arachnoid membrane sometimes follows on otitis, and suppuration of the internal ear.

9. Cerebral imflammation has followed on the drying up of ulcers of the scalp. There was probably an extension of the inflammation to parts within, and a consequent cessation of that without. But the current opinion in the profession that powerful applications, in certain chronic diseases of the scalp, are followed by metastasis, deserves to be respected.

In my own practice secondary has been more common than primary cerebritis. While the brain is more secluded than the organs of the other cavities from external causes, it seems more liable than any of them to participate in the inflammations of other parts; which, perhaps, arises from their reactions upon it, as an organ presiding (unequally) over the functions of the whole.

It is worthy of remark, that the spinal cord is much more seldom inflamed than the brain, either primarily or secondarily, which should probably be ascribed to its greater simplicity of function, and consequent inferior supply of arterial blood.

SECTION II.

CLASSIFICATION AND DIAGNOSIS.

I. Classification.—When an individual labors under fever, thoracic pain, cough and difficult respiration, we know that his lungs or their investing membranes are inflamed. These are generic symptoms, and tell of pneumonic inflammation; but do not inform us whether it is bronchial, cellular, or pleuritic. To determine this we resort to other phenomena—vital and physical—which being less general, and therefore serving as specific characteristics, become the means of differential diagnosis. If we apply this illustration to the phlegmasiæ of the brain and its meninges, we find that a considerable number of reliable generic symptoms are at hand, but that the guides to a specific distinction are entitled to little confidence. If this has been perceived and acknowledged by the great pathologists, who have

made cerebral diseases a special study, how much more must we, in the humbler and general walks of the profession, feel embarrassed by it. Happily, however, it is even less important in cranial than thoracic inflammation to decide on its exact seat before entering upon its treatment.

The causes of complexity in the symptoms, resulting from inflammation of the brain and its membranes, are the complicated functions of that organ; the sustaining and governing influence which it exerts over all the functions of animal, and many of organic life; the reaction which almost every other portion of the organization exerts upon it, and the disturbance of all or many of its functions from a morbid condition of any one of its parts. The semeiography which results from the modifying influence of these physiological conditions would extend through many chapters, and yet leave combinations of symptoms undescribed. Indeed, there is no department of semeiology in which generalization is so difficult—in which the same symptoms so often result from different pathological conditions, or different symptoms from the same condition, or in which every case displays so much that is peculiar to itself. Thus, almost every symptom has in different cases been absent; and if one were to attempt the construction of a generic character, he would find it necessary to take many which are not invariably but generally present.

It is common to divide inflammations of the cranial organ into meningeal and cerebral, corresponding, for example, to peritoneal and parenchymatous inflammation of the liver; but this is a division which cannot be expressed by the symptoms.

1. The dura mater in structure, functions, and anatomical relations, must be considered apart from the arachnoid and pia mater. The former belongs to the cranium, the two latter to the brain. Most of its inflammations are of limited extent, and connected, in origin, with lesions, or diseases of the bones, to which it is attached; and, of course, the symptoms of duramatritis or cranio-duramatritis, as it might generally be called, are not identical with those which result from inflammation of the involucra of the brain. When, however, the inflammation extends from the serous surface of the dura mater to that of the hemispheres, as in pleuritis pulmonum from pleuritis costalis, other symptoms are of course developed.

2. The gray, vesicular surface of the convolutions has a vascular connection with the membranes, as intimate as with the white fibrous tissue beneath, and participates in the inflammation of those membranes, or otherwise suffers from their morbid condition, more certainly, even than from inflammation seated in the depths of the cerebral substance. We cannot, then, distinguish vesicular or superficial *cerebritis* from *meningitis* by the symptoms, but must contemplate them together, and might not inappropriately apply to the two, the term cerebro-meningitis. It is true that the vesicular covering does not always participate in the inflammation of the membranes, but this can never be determined by the symptoms, which are at least to

ordinary observation the same, whether the complication exist or not. Here then we have a second, and by far the most common seat of encephalic inflammation. Why it is the most common results from two causes, first, the great arterial vascularity of the pia mater, and second, the vascularity and ever active functions of the vesicular substance.

3. The third is the white fibrous mass of the hemispheres, their fibrous commissures, and their fibro-vesicular ganglions. To this inflammation the term cerebritis is strictly applicable. It is not always, however, confined to the interior of the brain, but frequently reaches the vesicular coping of the hemispheres or the investing membranes, especially of the basilar portion and the ventricles. In this complication its symptoms approximate it to the other variety; but when restricted to the pulpy substance it presents phenomena which differ in several respects from those of the other variety.

II. The duration of the forming stage of encephalic inflammation,* has in different cases the greatest possible variety. When it results from external violence, sudden changes of weather, or a debauch, it may be developed *instanter*, but when occasioned by less energetic causes, its advances are often slow and insidious. Even the causes just mentioned may create but a predisposition, and lay the foundation for a future development. During this protracted forming stage there is no fever, and the impending inflammation is too often not foreseen. It is quite impossible to enumerate all the symptoms attendant on this period of lengthened incubation; and I shall limit myself to the following observations: *First.* The most constant symptoms are found in the animal functions, and consist of headache, disturbed and unrefreshing sleep, an occasional feeling of heaviness or lightness in the head, impatience and irascibility of temper, unsteadiness of attention, and diminished capacity for intellectual labor; but in some instances the mind displays unwonted and sustained activity. In a case which fell under my observation many years since, a gentleman, had shown for several months extraordinary strength and vivacity of mind, and immediately before it became necessary for him to lose forty ounces of blood at a single operation, he manifested an ability which surprised both himself and his friends. *Second.* The appetite is generally capricious, and the bowels still more frequently torpid. *Third.* Fits of head-suffusion, or determination to the brain, as it is called, are occasionally experienced, with a tendency to vertigo, especially after eating a full and stimulating meal, or indulging in the use of strong coffee or alcoholic drinks. *Fourth.* The feet are apt to fail in temperature, and the functions of the skin become impaired. *Fifth.* During this period hemorrhoidinarians, are likely to remain exempt from their habitually recurring malady. *Sixth.* Chronic inflammations and ulcers of the scalp are apt to cease.

* I shall employ this Greek term as a generic expression for all the intercranial inflammations, using the Latin cerebral and cerebritis for those which are confined to the parenchyma of the organ.

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seen the function of perspiration so completely suspended that venesection to approaching syncope has not brought out the characteristic moisture of the upper lip. Now and then, especially in children, convulsions, and even coma, occur in the midst of the symptoms which have been narrated.

The duration of the stage which has been described varies from a few days to as many weeks, according to the intensity of the symptoms. The transition to the third and final stage (when the tendency is to death), whether rapid or gradual, is characterized negatively by an abatement in the phlogistic intensity, by blunted sensibility, the supervention or increase of coma, dilated pupils of both, but in some cases of one eye only, strabismus, or, in its stead, a set of both eyes in the same direction, the axis remaining parallel. The sensibility of the optic nerves, always blunted, is sometimes extinguished. The external engorgement increases, and a mucopuriform secretion oozes from between the lids, or overspreads the cornea. The delirium passes into a kind of dementia, with muttering. Yet I have seen the patient wild and incoherent till near the close. Ordinary subsultus tendinum occasionally occurs; partial, or even general convulsions are frequent, and paralysis, generally of one side, now and then happens. The heart participates largely in this disorder of the organism, loses its energy, and becomes every hour more frequent, feeble, and vacillating in its action. The irritability of the stomach is now succeeded by torpidity, and the constipation of the bowels, in some cases, by colliquative diarrhœa, of the existence of which the patient becomes insensible before death.

When the symptoms which have been narrated occur, we may declare the case to be cerebro-meningitis. But many cases do not present the whole, and when the disease is of a mild grade, we are especially liable to error. The development of the third and last stage, will, it is true, at all times assure us; but this knowledge, not less than that afforded by *post-mortem* inspection, comes too late. I have spoken of the great importance of detecting encephalic inflammation in its forming stage, and may here insist that it is not less important to detect it in the inflammatory; for if that be allowed to advance far, the fate of the patient is sealed.

V. Simulating Affections.—1. A plethoric condition of the general system, especially when accompanied with constipation, may be attended with pain and heaviness of the head, vertigo on stooping or turning suddenly round, drowsiness, and dulness of mind. Such a condition might be mistaken for inflammation, when there is only simple distension of the vessels of the brain, with liability under external influences to congestion, especially of the venous sinuses. The absence of fever will, in general, enable us to distinguish such a case from one of inflammation.

2. Mere constitutional irritation, accompanied by neuralgic pain of the pericranium or dura mater, may be mistaken for cerebro-meningitis, and the frequency of pulse, so often attendant on this condition, may be taken for that of fever. A thorough acquaintance with the phenomena of inflam-

mation, scarcely to be acquired except at the bedside through a series of years, is necessary to protect us from diagnostic error in such cases. The hot skin and thirst of inflammatory fever are wanting; the frequency of pulse sometimes ceases suddenly, and is as suddenly renewed, with the abatement or revival of the morbid contractility of the heart; the tongue is seldom white with fur, and often looks pale and flabby; the bowels are not particularly torpid; external compression mitigates the headache; and, in some cases, there is sighing, apprehension, increased secretion of urine and other hysterical symptoms. Should blood be drawn in these cases, it may be sizy, yet the reduced size of the clot will account for that appearance without supposing a state of hyperinosis.

3. Every physician has met with cases of dyspepsia, accompanied with so much sympathetic suffering of the brain and organs of sense and motion as to suggest cerebral inflammation. Headache, dizziness, unsteadiness of vision, muscæ vlitantes, congestion of the conjunctivæ, spasmodic twitching of the muscles of the eyelids, and sometimes epileptic convulsions may occur. The bowels, at the same time, are torpid. The pulse may or may not be preternaturally frequent. If the dyspepsia be phlogistic (chronic gastritis), the skin may be unnaturally warm, and the tongue more or less covered with a white fur. In all cases there is thirst. The question, whether the cephalic symptoms are primary or secondary, is to be answered by a searching inquiry into the state of the stomach. If there be epigastric tenderness, and much gastric acidity or flatulence, increased by certain articles of food; if the secretion of bile is defective, and the urine high colored; finally, if the patient be within the dyspeptic period, that is, from the sixteenth to the thirty-fourth year, the affection of the stomach is, in all probability, primary—that of the head sympathetic and secondary.

4. In affections of the head the brain often suffers, through both the nervous and the vascular systems. In the early stages of a peri- or endocarditis the suffering is chiefly sympathetic; after that inflammation has generated valvular lesions and hypertrophies, the sinister effects on the brain are through the circulatory system. Many patients experience headache, vertigo, sense of fulness, incapacity for mental application, without suspecting that the origin of all their sufferings is in the heart. We must not be misled by the exclusiveness with which they may direct our attention to the head symptoms, and conclude that they labor under chronic inflammation of the brain. In all cases of mild or obscure head disease it will be proper to inquire into the condition of the heart by auscultation and percussion, without which we cannot be certain of correct diagnosis. In some instances there is actual cerebro-meningitis, associated with disease of the heart, but it is secondary or consequential.

5. In various parts of our Interior Valley there are periodical hemicranias, which may be mistaken for encephalic inflammation. The symptoms

and pathological character of these neuralgias have been already presented.* If such an attack occurs in one who resides in what is termed a malarial region, and especially one who has lately had an attack of autumnal fever, we may, without much hesitation, decide against cerebro-meningitis. But where these historical aids to diagnosis do not exist, we must be cautious in coming to a conclusion, as so great is the tendency to intermission and recurrence in all nervous diseases that some encephalic inflammations have closely simulated periodical neuralgia. In a doubtful case the safest decision is that which suggests an antiphlogistic treatment.

6. *Mania à potu* exhibits many phenomena in common with cerebro-meningitis. A frequent pulse, muscular agitations, wildness of the eyes, disordered sensation, a peculiar delirium, sleeplessness, and disposition to voluntary motion; yet therapeutic experience has shown that these symptoms do not depend on inflammation, for they are aggravated by an antiphlogistic treatment, and cease under the use of opium. Moreover even the fatal cases do not show us, in their dissection, either fibrinous or purulent secretions. The absence of fever, the maniacal persistence of the delusions, the tremulous tongue, above all, the history of the patient's habits, will direct us to a correct diagnosis. Nevertheless in the early stages of intemperance, and when the habit has been rapidly established, it cannot be doubted that inflammation is sometimes present. I only wish to say that it is not a necessary element of this malady.

VI. Cerebritis.—Pathological researches seem to have demonstrated that surface inflammation of the brain may exist without meningeal. If so, I presume it does not declare itself by any symptoms different from those which indicate cerebro-meningeal or meningeal inflammation; as the phenomena presented by the last are chiefly such as result from sympathetic or secondary suffering of the gray or vesicular covering of the convolutions. The cerebritis we are now considering is deeper seated, and affects the white fibrous tissue quite as often as the gray substance of the glanglions of the brain. As a general fact, it is more topical and circumscribed than the superficial inflammations which have been described, and tends more strongly to a suppurative character. When uncomplicated with meningitis, the phlogistic symptoms are less acute than in the variety which has been described. The pain and fever especially are not so violent, and in some cases bear not the least proportion to the impending danger. In some instances the pain is fixed in a particular spot, in others more diffused, and has even been felt in parts of the brain, which were found natural in a post-mortem inspection. Delirium is not so early nor so violent as in cerebro-meningitis; but lethargy and coma occur much earlier, and in some cases without previous delirium. Another distinguishing characteristic is pain and spasm, more or less tetanic, of some muscles, accompanied by paralysis

* Ante, p. 182–6.

s. Some of these muscular lesions closely resemble those produced mpoisoning with the preparations of lead. General convulsions s occur, and both hemiplegia and paraplegia are common. Ac- o the seat of the inflammation the lesions of sensation and motion rse various. When the inflammation is intense, and of consider- it, it may prove fatal in a few days; but more frequently it con- weeks and even months.

n the early periods of this inflammation the patient may die apo- or become permanently hemiplegic. The concourse of symptoms haracterize the third and last stages of fatal cerebro-meningitis are present in the closing stage of cerebritis, but are represented by coma, convulsions and [illegible] In some cases, presenting cerebral fter death, the patient wa[illegible] cious of any disease till stricken fatal apoplexy.

SECONDARY INFLAMMATIONS O[illegible] HE BRAIN AND ITS MEMBRANES. commonly take on the form [illegible] cerebro-meningitis, but in some f duramatritis, in others of [illegible] is. I do not use the term secon- [illegible] contradistinction to primary [illegible] *mation*, so much as to antecedent *fever*. When speaking of autumnal [illegible] tent fever,* this subject was presented, and it recurred upon us in [illegible] ng of the typhous and eruptive fevers, especially erysipelas. In all the cases I have seen, the symptoms were *substantially* the same as in primary ce[illegible] o-meningitis, though more or less modified by the character of the fever and the reduced condition of the patient, at the onset of the inflammation. This modification has much less bearing on diagnosis than therapeutics. It is seldom so great as to render the former difficult, but in many instances imposes great restriction on the use of those antiphlogistic measures which are so indispensable in primary inflammation of the encephalon.

SECTION III.

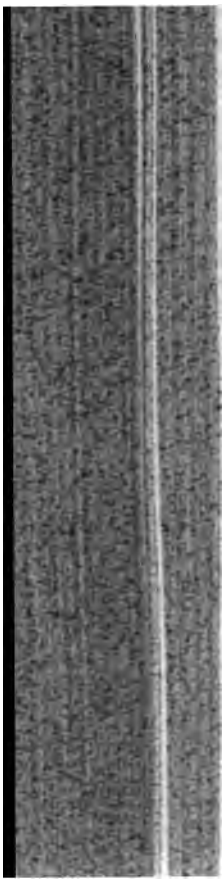
PATHOLOGY AND PATHOLOGICAL LESIONS.

I. SEVERAL experimental or speculative replies have been given to the question whether, from the anatomy of the head, there can be more blood in the brain at one time than another. My own experiments look to the conclusion that there can; and that what may be called a general congestion of the brain is a reality. If this were not the case, that organ would stand as an exception to the others, which require, receive and transmit more blood while in a state of functional orgasm than when quiescent. But it does not follow that, in every case of encephalic inflammation, the whole organ is in a state of hyperæmia. On the contrary, that condition like general plethora, has not perhaps any special tendency to the production of inflammation. It is more likely to eventuate in apoplexy without extra-

* Vol. II. p. 182.

vasation. Inflammation is essentially local, and has its centre. It never pervades the whole of any large organ. No one has ever seen the entire brain with its meninges in that condition. There *might* then be fatal inflammation within the cranium without its containing more blood than in health. Some portion only might be in a state of hyperæmia, while other portions, by the pressure of the swollen part might be anæmic. In every case of inflammation, there is, however, more arterial than venous blood, and it is the former which constitutes the inflammatory swelling as far as it depends on vascular turgescence. The *modus operandi* of the causes which bring about this condition presents some variety. *First.* An excited state of the nervous system of any part, causes arterial blood to accumulate in its capillaries. The brain is the largest mass of that system, and cannot be excited without thus reacting on the circulation. In this manner, excessive mental effort and sudden or powerful emotions may be followed by inflammation. The hyperæmia in these cases is not always, perhaps not often seated in the cerebral pulp; but established in the vascular membrane through which the former receives its supply, and on which it manifestly has a power of action. *Second.* In concussions from blows or falls, some portion of the organ remains enfeebled in its circulation longer than the rest, and when reaction takes place, its capillaries become injected, and the phenomena of inflammation arise. *Third.* In vicissitudes of temperature, in the sudden librations of the circulation from the exterior to the interior parts of the body, some portion of the brain or its membranes become engorged, and inflammation follows. *Fourth.* It is a physiological law that the excitation of the stomach by stimulating food and drinks, should excite the brain, and disturb its circulation. More blood *appears* to flow to it in a given time—perhaps less is transmitted through it, and thereby a state of capillary hyperæmia is induced in some part, which results in inflammation, a condition more likely to arise if the lower bowels be torpid and do not make their ordinary physiological revulsion from the brain. *Fifth.* The hypertrophied heart injects too much arterial blood, with too much force, into the brain. The distended arteries compress the veins which in some portion of the organ may not carry off the excessive supply, and thus a capillary hyperæmia may be established. *Sixth.* Some inflammations, as the rheumatic, are attended with a constitutional diathesis which causes the successive development of inflammation in all the fibrous structures, and may thereby attack the dura mater. Others, like erysipelas, travel by continuity of texture, and may reach the brain from the integuments of the scalp. *Seventh.* In various fevers, the perverted state of the vital properties and the visceral congestions so common in the whole, generate inflammations, some of which are found in the brain.

II. The fever attendant on encephalic inflammation, is, *cæteris paribus*, more acute in meningitis and cerebro-meningitis, than when the local affection is seated exclusively in the pulpy substance. In some cases the fever



which characterize the third a
not often present in the closi
apoplectic coma, convulsion-
abscess after death, the p
down with fatal apoplexy

VII. SECONDARY IN
—These commonly
cases of duramatriti
dary in contradistin
fever. When sp
sented, and it
fevers, especi
substanti
modified by
tient, at the
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Among these d
rities of the heart'
eding which relieves
es of sensation and of
ame cerebral infirmity, o

on and the fever may gre
r is there in all cases an abs
actions which gave rise to th
ily produced lesions of secreti
main after the actions cease, and
symptoms of the last stage of fat
but in the majority of cases, per
rippled condition of the organ, a
e forms of pathological change fou
Anatomy.—1. One of the most c
n supposed meningitis or cerebro-
e arachnoid and into the ventricles.
arises whether anything more than
t it may be the consequence of such
: but if symptoms of phlogistic excite
e. I should be disposed to believe the
neither lymph nor pus might be pre
may be affirmed that the serous accum

quantities as to render it turbid. In other cases the quantity of serum is very small, and the fibrine is chiefly found in deposits underneath the arachnoid, rendering that membrane opaque. This is the characteristic lesion of cerebro-meningitis; especially when acute and rapid. When mild, its proportion to the serum is much less. When the inflammation, as sometimes happens attacks the sinuses of the brain, they become plugged up in part by the fibrine of the secreted coagulating lymph, and in part by the fibrine of the arrested venous blood.

In certain limited and chronic inflammations of the cerebral substance, the part is found in a state of induration. This is the result of the effusion and organization of lymph. Such a condition slowly produced may not be incompatible with life, and is often found after death from other diseases, the cerebritis having been cured, or ceasing spontaneously. Pus is not often found on the membranes of the brain, but is more common than lymph in the cerebral substance, both gray and white. Sometimes it is encysted, at other times diffused, and mixed with the broken down cerebral substance. The two elements are distinguishable by the microscope. This is one of the forms of softening. Another presents the same kind of disorganization without the purulent secretion. A free secretion of serum probably contributes to this softening. In some cases these lesions of the brain seem to be produced suddenly, in others slowly. As they are sometimes found in individuals who have died without previous signs of cerebral disease, it is possible that the cases of apparently sudden softening have been of long standing, and the fatal cerebritis but an aggravation of a mild and insidious inflammation. Of softening not dependent on that pathological condition, this is not the place to speak.

SECTION IV.

PREVENTION AND CURE OF CEREBRO-MENINGITIS.

I. Prevention.—The difficulty of arresting this inflammation, greatly augments the value of prophylaxis. An abatement in mental application, may often arrest the disease in its forming stage. Wearing the hair short, wetting the head night and morning, and lying with it raised, are not unimportant measures. Where there is a manifest tendency to the disease, an abridgment of diet and total abstinence from alcohol and all narcotic stimulants are indispensable. The feet should be bathed at night, and kept warm at all times, so as by revulsion to counteract the tendency to cerebral congestion. If an ulcer or chronic inflammation of any kind, on beginning to heal or abate, should be followed by signs of encephalic inflammation, a blister should be applied over the affected part. But in all cases the preservation of an open habit of body, and even free purging, may be regarded as the most important preventive. The blue mass and aloes alternated with Epsom salt are the best aperients, as they act on the liver, the mucous mem-

seems to precede the inflammation; in some to fol[low] the irritation and free simultaneously with it. They act and react on [each] from the brain. Under subside together. When the inflammation is n[ot] especially when simple coningly slight, and when both mild and limited [by] of the blood, has constituted absent. In true cerebritis, this is often th[e] result, active exercise in the organization of the brain may be brought a[bout] should be recommended. The of the organism generally. We have alrea[dy] ord and muscles of locomotion, fever many disturbances of function occ[ur] ied off, revulsion from the brain They are often spoken of as sympath[ies] more correct to refer them to the influ[ence] of acute and violent cerebro-meningitis organism. This influence in healt[hy] ganizations will take place. The cure laws, but when the organ is infla[med] me agencies used in severer, employed imparted in a pathological manner over which it had presided in h[ealth] greater moment. Having made a reliable tion we may enumerate the ir[ritants] should be immediately cut close with scimuch diminished by a copiou[s] time with tepid water. His feet should at gestion; the various morbid [secretions] warmer water, and rubbed to redness. His motion, are referable to th[is] and his pillows not so soft as to bury up his bation.

so to raise the upper portion of the trunk

III. Both the inflam[matory] the head of his bedstead should be on the side recovery not take place [the] the light is admitted, and the wall on which nomena. The diseas[ed] same color. The admitted light should be broad febrile symptoms, [or] than is required for the purposes of the organizations, whic[h] air should not be shut out in warm and mild by what constitu[tes] the radiant heat of the fire or stove should not they may be re[gard] head, nor should the temperature of the chamdeath follows [it] may be necessary to the comfort of the attenan enumera[tion] ps or candles should not be allowed to fall on his

IV. *Pu[rity]* e abated in and around his apartment, and all found af[ter] those who wait upon him, whose conversation, however, effused [to] rs, but loud enough to be distinctly heard by him, alone, [by] ing constant efforts to ascertain what is said. Every had c[ome] withheld; cold or subtepid drinks may be freely pethinl[y] of his head with tepid water ought to be continued exis[ting] that the common practice is to apply ice or ice-water ma[y] condemn it. But as the external heat of the head th[at] low the standard of health, by subtepid sponging or p[ro] aken to promote evaporation, and as water of that r[e] soothing influence on the nervous system, I have very [re] so applications of icy-coldness. Measures fitted to [re]duce heat of the feet and legs, should be diligently em-

[Th]e relations which the brain bears to the organs of sense, [and] stomach, we see at once the indispensable necessity of ex-

cluding as far as possible every agent capable of exciting them, and my own experience assures me, that this regimen is of equal value with all the other measures of cure.

2. Arrangements having been made for placing the patient in bed, he should sit upon it and be bled till manifest signs of approaching syncope appear, when he should be laid down. To produce this effect, the loss of sixteen, thirty-two, or even forty-eight ounces may be necessary. Such a bleeding will in many cases be sufficient, but in a greater number the operation must be repeated. A third, and in rare instances a fourth may be required; but none of them should be as copious as the first, except when that is employed in the forming stage, at which time syncope *may* occur from a small bleeding. Too ready a resort to cups and leeches must be avoided; but when we are in doubt about the further use of the lancet they may be substituted for it.

3. The next remedy in time and value is purging. As soon as the patient has recovered from his tendency to fainting, an active cathartic should be given. From ten to twenty grains of calomel, to be followed by Epsom salt in senna tea, may be administered, or ten grains of jalap and ten of calomel. The object is not merely to evacuate the existing contents of the stomach and bowels; but to promote free secretion from both the liver and the intestines, whereby a most salutary revulsion from the brain is effected. Throughout the whole course of the disease, the bowels should be kept in an open and secreting state. When the first cathartic does not operate in due time, an enema would seem proper. Such tardiness, however, shows that the loss of blood had not been great enough, and a return to the lancet will generally bring on the operation of the medicines better than a resort to the syringe.

4. After the effects of the first cathartic are over, the exhibition of calomel should be commenced in two, three, or four grain doses, every six or eight hours, and continued until the abatement of the disease is manifest. Of all the antiphlogistic alterants it is the best in this inflammation, the arrest of which cannot safely be confided to depletives and revulsives.

5. Of the value of epispastic irritation in this disease, I am less assured, than of that irritative secretory action which is produced by purgatives. In observing the rule not to apply them till the phlogistic excitement is reduced to a certain undefined grade, they are often postponed too long. To make a metastatic transfer of the inflammation, they should be applied while it is yet in the forming stage. If the first bleeding and the first purging have been what they should be, large blisters may be applied to the legs or to the nucha immediately after their employment. The next application should be to the scalp of one side of the head—the last to the other side. The practice of deferring this application to an advanced stage of the disease has nothing to sustain it; I have not then found it useful, and it is generally opposed by the friends, who might have consented to it at an earlier period.

6. Beyond these few and simple measures, but little, I apprehend, can be done to resolve a meningitic inflammation. Under their influence, the disease often yields kindly, and early signs of convalescence appear. But there are cases in which such signs do not show themselves, *pari passu*, with the decline of phlogistic symptoms, and in their place we have the phenomena of constitutional irritation and exhaustion. The movements of the heart are frequent, quick, convulsive, and loud; the skin, variable in temperature, does not resume its natural functions; the mouth is dry, and the tongue shows a brownish hue; more or less subsultus tendinum and restlessness occur; the mind is capricious and unsettled, or there is full delirium, and, with occasional soporose periods, there is general watchfulness with contracted pupils, and a staring and anxious expression of the eyes. The physician is often at a loss as to the import of this group of symptoms, and uncertain whether they declare increasing inflammation or a state of exhaustion and morbid sensibility, produced in part by great depletion, and in part by the seat of the inflammation being the brain. Cases presenting all the symptoms of nervous irritation here enumerated, are, it is true, sufficiently marked; but many fall short of the whole, especially in the first or developing stages of this pathological condition. Having decided on its existence, all depleting and counter-irritating treatment must be discontinued for one that will sustain the sinking energies, and allay the morbid sensibility of the nervous system. Moderate quantities of gelatinous and amylaceous food should be administered with wine whey or weak spirits and water. Of medicines, Dover's powder, in broken doses, a syrup of morphia, with wine of ipecac., or a solution of carbonate of ammonia with paregoric, and one of the salts of morphia, is the best, and should be administered at short intervals, till composure and sleep are produced. If cold applications to the head had made a part of the previous treatment, they should be discontinued; the feet must be kept warm; and under the influence of a weak infusion of serpentaria, eupatorium, or sassafras, a general diaphoresis, or actual perspiration should be brought on, and if possible kept up. Should the patient live in what is called a malarial region, it may further be advisable to combine a portion of sulphate of quinine with the medicines which have been named, as many of the phlegmasiæ, in such localities, show, after great depletion, the impress of the cause of autumnal fever. A simpler method, which is sometimes signally successful, is the administration of a large dose of laudanum, Dover's powder, or one of the salts of morphia—a dose that would equal in its narcotic effects, two, three, or even four grains of solid opium,—a good practice when the diagnosis is correct; but injurious, should the symptoms depend on inflammation.

If the patient be not relieved by this treatment, the prognosis of the case is fatal. Inflammation is still lingering in some part of the brain, while the powers of the system are becoming exhausted, or serous effusion is going on to the production of mortal compression, and this brings us to the treatment of the final stage.

7. I have made and read the history of a number of *post-mortem* examinations, in which the appreciable anatomical lesions seemed insufficient to account for the death of the patient. In such cases it is, I presume, the consequence of the lesion of cerebral function, which has just been described, aided, no doubt, by whatever anatomical derangement may exist. In other, and the majority of fatal cases, the exhaustion from excess of action in the brain still being present, the lesions are extensive, and seem to play the most important part in the production of a fatal result. Now it is that we have symptoms of compression, and sinking energy. Coma and muttering delirium; a dry and dark tongue which the patient cannot protrude; dilated pupil; strabismus; feeble and intermittent pulse; subsultus; spasms and paralysis, as enumerated in the preceding section. When a majority of these symptoms are present, recovery, if not impossible, should never be predicted or expected. But what can be done to remove congestion, arrest serous, sero-fibrinous or purulent secretion, promote absorption, put a stop to softening, and prevent the rapid sinking of the vital powers? I have tried, and seen tried by others, many things, but have no evidence that they have ever been successful. Internal stimulation; the internal and external use of mercurial applications in large quantities, with the view of exciting a salivation; a blister over the whole scalp, and sinapisms to the lower extremities, or the application to the latter of scalding water, have but too often failed to produce any effect. Yet it is not necessary to condemn their use; for the insensibility of the patient, which in general precludes their doing good, at the same time defends him from any suffering from their employment. When he does manifest suffering, his case is less desperate, and they may then be of service.

III. Treatment of Cerebritis.—When our diagnosis excludes meningitis, and places the inflammation in the cerebral substance exclusively, are we to employ a different or the same treatment which has been recommended for meningitis or cerebro-meningitis? The treatment should be substantially the same; but in general the inflammation is more circumscribed and its manifestations less acute. Still further, there is much reason for believing that it forms and advances in a more insidious manner, and is often tending to suppuration or the destruction of the cerebral substance by softening before the physician is called in, or at least is fully aware of the true condition of his patient. It must be granted that under such circumstances the antiphlogistic treatment is the only one which can be employed with any prospect of success; but it cannot be carried so far as in cases of cerebro-meningitis, and high hopes of its success should not be cherished. That treatment is directed against a phlogistic diathesis, and the system is tolerant of it in proportion as the diathesis is intense. But in cerebritis, internal and local, there may not be great inflammatory excitement, and yet a fatal, though perhaps very limited disorganization of the brain may be going on.

6. Beyond the... be done to re... the disease often... But there are ... with the declin... phenomena of ... the heart are ... temperature, ... the tongue ... restlessness ... lirium, and, ... with contra... The physi... and uncer... exhaustio... in part ... all the ... ciently ... develo... existe... for ... bilit... lac... w ... v ...

...anger, and ... ...itis, and œdem... ...v a general phlogistic diathesis ... ...on; and from the peculiar fac... ...ted, produce permanent infirmity ... ...rt and the general system harmonise. ...neral antiphlogistic treatment shows ...metimes easier to subdue an extensive ... ...ne more limited or less intense. In ...spreading meningitis of the convolutions ... ...ne lining membrane of one of the ven...

...cephalitis uncomplicated with meningitis, we ... ...leeding, we may administer calomel freely, ...oid or subtepid applications to the head are ...on is perhaps more, and cathartics of equal

...ng, and ventricular effusion, or either of them ... ...to be shown, that any treatment can be success... ...case of recovery, it is uncertain whether, in fact, ...

...HRONIC ENCEPHALITIS.—As autopsic examina... ...ages of encephalic inflammation, though no fever ...ns of that affection had occurred during life, we ... have under this head many cases which no skill ...h certainty refer either to inflammation, neuralgic ...tion, or sympathy; and, therefore, many cases of ... overlooked, and many non-inflammatory affections ...hronic encephalitis. It would be difficult, I think, ... diagnosis as unsatisfactory and uncertain as this. ...all doubtful cases is to class them with the inflam... ...uld not be such, the antiphlogistic treatment, unless ...no harm, may even be of much *preparatory* value; ...nd, should inflammation exist, it would be increased ...ulants, tonics, and narcotics.

...this affection, a single copious bloodletting will seldom ... and proves beneficial in many. After that, leeching ... sufficient as far as the loss of blood is concerned. ...gentle aperients afterwards will be proper. A mild ...ercurial course, consisting of a grain of calomel morn... ...quently of excellent effect. Blisters to the nucha, ...purulent discharge under the use of stimulating ... irritating foot-baths, and every means of maintain... ...n of the lower extremities, are important. A

reduced diet persevered in is indispensable; and all alcoholic stimulation should be avoided. Finally, every cause of mental excitation, and all severe labor of mind should be avoided.

An Illustrative Case.—It is probable that chronic encephalitis is connected with many lesions of sensation, motion, and even organic function, which have received nosological designations that do not fasten the mind upon that pathological condition, but lead it in an opposite direction. These designations are vertigo, congestion of the brain, amaurosis, deafness, loss of smell, local spasm, and local palsy, epilepsy, hemiplegia, neuralgia, hydrocephalus chronicus, dyspepsia, and disease of the heart. Most of these terms do indeed direct our attention more or less to the brain, but not to inflammatory action in that organ, and some of them not even to simple congestion. As illustrating the pathological connection, cotemporary or consecutive, which may exist among them, I present the following case which occurred many years since in my own practice, and was published more circumstantially in 1827.*

"On the 24th of May, 1824, I was requested to visit Mr. J. R. W., of Cincinnati, aged about forty years, who had for several months been confined to his house with neuralgia of the left side of his head and face. The history of his case, as compiled from the statements of himself, his family, and one of his attending physicians, is as follows:—

"His father, and some of his brothers had been subject to gout. For many years he led a seafaring life as supercargo of a trading vessel, and afterwards resided in one of our eastern cities as a merchant. He was always temperate in drinking; and not intemperate in eating, though he had a strong appetite, which he had not particularly restrained, and could eat, without acidity or flatulence, many things which are apt, in ordinary stomachs, to produce those symptoms. He had been generally subject to *constipatio intestinalis;* but up to his thirty-fourth year his health was good, and his constitution seemed unimpaired. About this time (December, 1819), being in high health, he was suddenly affected, in one of the streets of Philadelphia, with general debility of his left side. After leaning against a pillar of the market-house for a few minutes, he recovered, and proceeded to his place of destination, the court-house; where, in a short time, the hemiplegia returned. A physician being called in, he was bled copiously, and then carried home. Five or six successive bleedings, with the liberal administration of cathartic medicines, so far relieved him, that in ten days he was able to serve as a juryman, in a case for which he had been selected before his attack. After serving two days in this capacity, he was seized with a violent headache, for which he was cupped with advantage. Three days afterwards, when confined in a close and hot jury-room, the atmosphere of which was loaded with tobacco smoke, the paralysis returned, but was

* Western Medical and Physical Journal (Cincinnati), vol. i. p. 11.

The *seat* of the disease is the great source of dange· ·ry.
of the same kind in iritis, valvular endocarditis, a· ·l
which, unaccompanied as they often are, by a ge ·. In
will to our surprise, survive copious depletion; · winter,
tions of the organs in which they are seated, pr· On his way
speedy death. It is when the inflamed part and · in Philadelphia,
so to speak, in their diathesis that general · much impaired;
its greatest power; and hence it is sometim · , when it began to im-
or very violent inflammation, than one m· ·y restored.
children it is easier to arrest a wide-spread · this deafness, he observed his
than an inflammation limited to the lin· ·btuse. It gradually became en-
tricles. at the same time, felt into a state of

But if in many cases of cerebritiaues. In the month of September,
derive less aid from copious bleed During this autumn he had two attacks
for its alterant effects; and if colds, neither of them attended with chills
of less value, counter-irritation i hard, indolent, and insensible tumor
utility. mouth and his ear, within the limits of the

When suppuration, softening discolored, but it suppurated slowly, and
has taken place, it remains to be the succeeding summer he drank, for about
ful; for in every supposed and the ulcer slowly healed up. In August
those lesions had occurred fever. In December, when in Louisville

IV. TREATMENT OF [illegible] lesions, he again suddenly suffered
tions have shown the ra with feelings similar to those attendant
nor received diagnosti · He was immediately bled, and got better.
may well believe that · of the winter was good. In the month of
in symptomatology ca · for Philadelphia, and returned in March. On
irritation, simple co · a bilious attack,' which left him weak and dis-
chronic encephalitis · ·ted to take a bitter infusion. This he con-
treated as if they · of April and May, within which period he lost
to find any other · ·pressed in spirits.

A safe practic · I was consulted now began to show itself. The
mations; for t · ·enced, was chiefly in the back part of his head.
persevered in · ·me weak, watery, and somewhat red, with slight
while on the · June he visited Philadelphia, and the disorders of
and prolong · ·ing, with signs of general debility, he was advised

In the · ·al gentleman to use tonics, a nourishing diet, and
do harm · ·ed the two former; but, resolving to return to Cin-
and cupp · Before leaving the city, he was cupped to the
Purging · from which, however, he seemed to receive no
and lo · ·ed, and by autumn had established itself in the
ing ne · ·k of the left side. At first it appeared chiefly in
follo · ·m of an excruciating paroxysm; but at length it lost
dre · ·, and becoming more constant, was rather less pun-
i · to the time when I saw him, his sufferings had been

nearly incessant. In the month of January, 1824, after experiencing aggravated pain, from the application of caustic to his temple, in the day, he was seized, soon after lying down at night, with an epileptic fit, preceded by a scream, attended with frothing at the mouth, and followed by deep stupor till midnight. On the 16th of the following May, a week before my first visit, when sitting up in the forenoon, comparatively free from pain, and conversing with a friend, his face was observed to flush, and became suddenly covered with sweat. He, at the same time, complained of feeling bad, and was laid on the bed, where he had three epileptic convulsions, attended with the same symptoms as before.

"When I saw him, a week after this event, his situation, he thought, was not materially different from what it had been for the preceding six months. He had several exacerbations of pain in the twenty-four hours, some of which were intensely severe. They recurred at no regular periods. In the remissions, the affected parts, from the upper region of the forehead to his mouth, became the seat of a great variety of indescribable sensations; such as might be supposed to arise from the puncture of the slenderest needle; from minute insects crawling in the skin; or from the passage of a fluid through the apertures of the subcutaneous cellular membrane. The first kind of sensation was generally between the upper lip and the eye; the last more commonly in the forehead and temple. None of these feelings were of a pleasurable kind. The whole left side of the face and forehead were often perceptibly tumefied, and sometimes slightly œdematous. That side of the forehead, and the eye, were often red—the former exhibiting a circumscribed flush. The sense of taste, in the left side of his tongue, and the natural feeling of his mouth and teeth, of the same side, were much impaired. But none of his teeth were tender or decayed. The left angle of the mouth hung a little, while the *other* was slightly retracted. The pain was generally aggravated by a recumbent position. He was never chilly; but often had flushes of heat in the evening. His tongue was red, and slightly furred. His pulse was variable, fluctuating from eighty to one hundred beats a minute, and not remarkable for force or fulness. He was able to walk about his room. His memory was much impaired, and his temper irritable."

Here then was or had existed moderate hemiplegia of the left side, partial deafness of the left ear, impairment of taste in the left side of the tongue, total loss of smell in both nostrils, epilepsy, failure of memory, irascibility of mind, and lastly, intense neuralgia of the first and second branches of the fifth pair of nerves of the left side, with congestion and œdema of the loose texture of the eye and the surrounding parts.

To this neuralgic affection the attention of the patient and his physicians had been chiefly directed, and,

"Within the preceding eight months he had been subjected to the following plans of treatment:—

arrested by another bloodletting, performed on the [illegible], chiefly with mercurial
He was then taken home a second time, where [illegible] result.
through the ensuing spring, summer, and autumn [illegible]erri, the bark, and the sul-
October (1820), he visited the western country, various adjuvants, but to no
in his usual health, and started home in the [illegible]
back, he had an attack of catarrh. Soon [illegible]ussic acid, cicuta, stramonium,
he discovered that his sense of hearing [illegible] produced their specific morbid
and it continued so till the month of Jun[illegible] rather to increase than mitigate
prove; and by the spring of that ye[illegible]

"About the time that he first exp[illegible] was thought to be injurious.
sense of smelling, in both nostril[illegible] seemed to be useful.
tinct; and the Schneiderian membr[illegible] antispasmodics; such as great quan
deficient secretion, which still [illegible] tincture of colomba and gentian, with
1821, he emigrated to Cincinn[illegible] and a mixture of the tinctures of asa
of sore throat (*cynanche pha[illegible]*, with ammoniated alcohol and lau
tion. In the following win[illegible]
peared between the angle o[illegible], consisting chiefly of blisters, issues,
left whisker. The skin [illegible] stimulating and anodyne embrocations.
was regarded as scrofulo[illegible] with frictions, and as much exercise as
time, a decoction of *[illegible]*
he had an attack of [illegible]ng, and indeed almost composed of animal
health, and pursui[illegible] the consumption of two quarts of French
loss of power in hi[illegible]

on the hemiplegi[illegible] the symptoms and treatment of this case, I
His health for t[illegible]ding on the existence of chronic inflammation
February, 1828 [illegible]anium, and in recommending an antiphlogistic
his way back [illegible]umation and cupping, purging, a reduction of diet,
dered, for w[illegible]al stimulants, tonics, and narcotics. The patient,
nued throu[illegible] his physician, that his disease was *nervous*, and
child, and [illegible] remedies were laid aside, and all the sooner, if de-

"The [illegible]mmend, at first refused; but in a day or two consented,
first pai[illegible] adopted. It is not necessary to the end I now
At len[illegible] details of daily treatment for the next three weeks,
pain n[illegible] as a general statement with the results will be
his h[illegible]

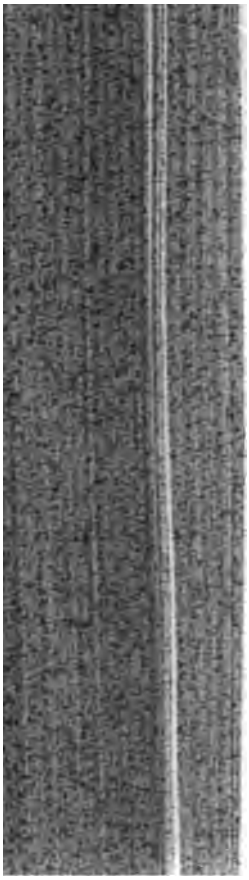
by a [illegible] purposely limited to six ounces. The blood was
sem[illegible] produced no effect on his pulse. In two days he
cinn[illegible] ounces. Blood buffed. In three days he was cupped
[illegible] days bled to half a pint, the clot sixy and cupped;
[illegible] fourteen ounces, clot the same; four days afterwards,
[illegible] not noted; after the lapse of an equal period, last
[illegible]matory crust thicker than before; at the end of three
[illegible] which was less sixy and cupped than the last; in four
[illegible] still less inflammatory. This was the last bleed-

ing. In three weeks he lost ninety-eight ounces; and was yet much stronger at the end than during the use of stimulants; notwithstanding other, so-called, debilitating measures had been employed throughout. These were tartarized antimony in minute doses, calomel to the extent of a slight salivation; the same medicines combined with jalap and nitre, as a cathartic; the first dissolved in a solution of sulphate of magnesia, for the same purpose; oleum ricini, and in the latter periods, salino-sulphurous water, a sedative aperient. At different times during the treatment, a state of nervous irritability was quieted with spiritus Mindereri and paregoric, Dover's powder, and assafœtida pills. When the active treatment was discontinued, at the time just mentioned, his pulse which ranged from ninety to a hundred in the beginning, had fallen to seventy-two. His physiognomy had become natural, and he felt better than he had done in ten months. Five days after the last bleeding he rode two miles in a gig, and returned hungry and sleepy. From this time he took no medicine except the sulphur water; rode daily, and was soon able, on foot, to visit his counting room. A more generous, but still an abstemious diet was ordered. He slept well. Occasionally in the evening, he had some œdematous fulness of the left side of the face; but in the morning and through the day, its appearance was the same with the right side. He ceased to have any pain, and suffered but little from the sense of *motion* in the parts which had so long distressed him. His pulse remained variable and easily excited. His spirits became buoyant, and his friends thought him more animated and conversational than he had been since the attack of palsy in 1819.

CHAPTER VIII.

INFLAMMATION OF THE NERVOUS CENTRES CONTINUED: TUBERCULAR ENCEPHALITIS—HYDROCEPHALUS.

I. In contemplating the diseases of children and adults we are not always quite consistent. Thus we do not distinguish the pneumonias or dysenteries of one age from those of another, while we speak of cholera infantum and cholera morbus, and give to encephalitis the name of hydrocephalus acutus when it occurs in children. This diversity of nomenclature for the same malady, according as it appears in childhood or adult life, is well fitted to mislead us by suggesting diversity of pathological condition, when none in reality exists. In the disease we are now studying, however, there is some foundation for the use of different terms, though not for those which are commonly employed. The quantity of serum ordinarily found in the ventricles of the brain after death from the acute encephalitis of children, is not such as to justify its classification with the true dropsies of the brain, resulting from increased secretion into the ventricles, without inflammation,



"4. A short course of arsenic, which was thou
"5. A gentle mercurial course, which seemed
"6. Palliatives, antidyspeptics, and antispasm
tities of opium, in different forms; a tincture o
aromatics; the tincture of mur. ferri, and a mi
fœtida, valerian, guaiacum, and castor, with
danum.
"7. Unceasing topical applications, con
electricity, and a great variety of stimulati
"8. The general warm bath with fr
possible.
"9. A nutritious diet, embracing, an
food, rendered stimulating by the co
brandy every week."

On reviewing the history of the s
would not hesitate, in deciding on
within the cavity of the cranium,
method, consisting of venesection
and an abandonment of all stimu
who had been taught by his ph
that he would sink if those reme
pletions should be substituted, a
and a new treatment was adop
have in view to give the detai
when it was laid aside, as
sufficient.

The first bleeding was p
sizy and cupped. Its loss

having it are more obnoxious to various causes of inflammation than those from whom it is absent. Thus it plays a twofold part—inviting that form of morbid action, and also rendering it more difficult of cure. With a tubercular diathesis this form of inflammation may be developed without the agency of any exciting cause, and is then said to arise spontaneously. It seems probable, however, that in such cases tubercular deposits have gradually taken place in the brain or its membranes, and, as in the lungs, irritate the tissues into inflammation. With its exsanguine condition, rapid development, and great activity of function in childhood, a very slight irritation, primary or secondary, may awaken inflammatory action. The activity of which I speak is shown by the incessant *voluntary* motion of children, their rapid and unwearied observation, their speedy acquisition of knowledge, and the exceedingly active and efficient performance of the functions of respiration, circulation, digestion, and assimilation during the period of growth, in every one of which the brain plays a more or less important part. With this predisposition very slight causes may excite encephalic inflammation, but when an occult, congenital proclivity to tubercle pervades the constitution, all exciting causes are still more dangerous. Thus falls and blows on the head, which in the absence of that constitutional lesion might do no harm, may awaken inflammation; and so of gastric repletion, intestinal, or verminous irritation, sanguineous repletion, improper exposure, and inordinate mental exertion, the commonly assigned causes of encephalic inflammation. They may generate it in any child, but are more likely to kindle it in one having the tubercular diathesis. Of the whole the cause which does most injury is mental application, prematurely diverted from the natural channel of spontaneous, diversified, out-door observation, to in-door book studies, which embarrass the young mind with abstractions, and overwork and irritate the brain, whereby its circulation is disturbed, while the reduced state of respiration prevents due elimination from the lungs, and promotes the tubercular development. As unsound or imperfect fruit ripens first, so children of this diathesis often have precocity of mental and moral development, which leads them to studies not appropriate to childhood, and fatally misleads parents as to the discipline which should be exercised over them as a means of prevention. A few years since I saw a little boy, who in his fourth year was observed by his parents and myself to be daily soliloquizing in rhyme and verse, of which he himself manifested no consciousness. His large head, blue eyes, transparent skin, soft muscles, and sandy hair were additional indications of a tubercular temperament. He had moreover lost a brother with encephalitis. The parents were advised to take no encouraging notice of his poetical effusions, to postpone teaching him the alphabet, to bring him up on a simple diet, and to send him as much as possible into the open air. This course was pursued, and the rhyming propensity ceased. He was kept from school till the seventh year, when he applied himself with astonishing success, though not urged on, but occasionally withdrawn, and encouraged to go at large. He is now in his

eleventh year, with a fair prospect of good health; but I cannot doubt, a different course had been pursued, he would have fallen an early victim disease of the brain, in the form of encephalitis or convulsions, or becom permanently epileptic.

As in many other diseases so in this, their etiology and prevention shou be studied together, and constitute by far the most important part of the history. I long to see the time when prophylaxis—which rests on etiolog predisposing and exciting, physical and moral—shall be elevated to its ju and high rank among the departments of medicine; when diagnosis, med cation, and morbid anatomy will not fill the measure of our ambition, and shall be felt as a holier duty to labor for the prevention rather than the cu of all diseases.

Puerile encephalitis, both simple and tubercular, is what may be called common and fatal disease in our Interior Valley, and occurs more frequent in the city than country. I have found it in every latitude which I ha visited; but we have no statistics fitted to determine its relative prevalen in different climates, or show whether it has any climatic relations.

III. I do not propose to go into the symptomatology of this disease, fully developed in all our standard works; but limit myself to a few remar on its forming stage.

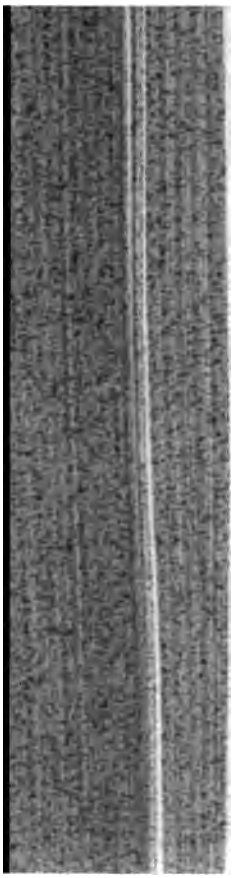
The symptoms, corporeal and mental, which indicate this stage, are ofte insidious and unsuspected by parents. When dependent on external vi lence, whether the constitution be tuberculous or not, it is often awaken suddenly, and then assumes an acute character from the beginning. Y such causes *may* be slow in developing their effects; and hence the disea even in its simple form, is sometimes said to arise spontaneously, the acc dent having been forgotten, or never known by the parents. Another ca of sudden access is that in which an acute disease, as erysipelas, measle scarlatina, or inflammatory cholera infantum, suffers a metastasis to th brain. Of the last I have seen several examples. All these are instances secondary encephalitis, perhaps some of them are but sympathetic cerebr irritations; but whether one or the other, they are eminently dangerous and their rise should be narrowly watched by the physician.

But a far greater number of cases come on slowly. This is especially th case when tubercular lesions of the brain, whether going before or accompany ing the inflammation, are in question. The child keeps on its feet, but is discon tented and irritable, reputed to be cross, and perhaps punished; its face i sometimes flushed; its appetite and bowels irregular, its stomach unsettled, and at night, if closely examined, it will sometimes have febrile heat, and a frequent pulse.* When the child is of sufficient age, it will often complain o

* In feeling the pulse of children when asleep, I have generally found it intermittent. When thi observation was first made, although the child was in apparent health, I apprehended that some di ease of the brain was forming, but it was not so. I have since repeated the observation many times on healthy children asleep, and found the same intermissions. I do not know whether the same thing has been noticed by others, and my own observations are not so numerous as to justify a physiological generalization.

headache, especially after violent play or exposure to the sun, when the parents are apt to ascribe it to a cause which, if the brain had not been previously diseased, would not have produced it. These symptoms should, in all cases, suggest forming disease of the brain; but especially if the child be known to have a tubercular diathesis,—if either of the parents has died of consumption, or a brother or sister labors under scrofula, or has died of encephalitis. When difficult or painful dentition is the exciting cause, the symptoms may be nearly the same, and may cease under the use of the gum-lancet and free purgation. If worms excite an intestinal irritation that is propagated to the brain, the abdominal and cerebral symptoms will be combined, and the whole *may* cease under the use of an active vermifuge; but as a predisposition to encephalitis may be the condition which gave to the verminous irritation an influence on the brain, the disease forming in that organ may be only abated, not arrested, by the expulsion of the worms, and the little patient should be narrowly watched for some time. Again, hooping-cough, not so much through the innervation (like worms and teething) as through the circulation and the respiration, becomes complicated with encephalic symptoms, which from their earliest manifestation, should be regarded with concern. Still further, chronic cholera infantum insidiously affects the brain, or encephalic disease contributes to keep up that affection. A diarrhœal condition of the bowels continues long after the season for cholera infantum is past, and resists all medication, diet, and country exercise. If closely examined, the child is found feverish at night. It loses flesh, and is unhappy and fretful, with an anxious expression of countenance. The whole disease is too often referred to the bowels, both by physician and parents, till the sudden supervention of convulsions, hemiplegia, dilated pupils, and strabismus, or a part of these symptoms, declare the existence of a fatal encephalic affection. Finally, as in the encephalitis of adults, few or no direct and obvious cerebral symptoms may occur, but in their place the disturbed function of some distant organ; an example of which I once met with in a little child, which showed scarcely any sign of disease, but a certain degree of emaciation, and a hectic cough, over which medicines exerted no control. At length several symptoms of diseased brain, including palsy of one side, and convulsions of the other, suddenly supervened, and the patient died; but the mother would not permit a *post-mortem* examination for the purpose of ascertaining the true character of the disease.

IV. Pathological anatomy has done more in revealing the inflammatory character of the disease we are now studying, and in placing it among the simple or tubercular phlegmasiæ, than in fixing on any particular portion of the brain as its specific seat. The lesions are, in fact, formed in almost every part, membranous and parenchymatous, in different cases; but oftener in and around the ventricles than elsewhere. As far as the treatment is in



cation, and morbid anatomy will p… …y with
shall be felt as a holier duty to l… …ne of t
of all diseases. …ntricles.

Puerile encephalitis, both si… …ative of un
common and fatal disease in … …ath the ara
in the city than country. … …mbrane of t
visited; but we have no st… …ts as detached
in different climates, or s… …s turbid.

III. I do not propose … …n to occur, our
fully developed in all o… …e case.
on its forming stage. … both the pia mat

The symptoms, corr… …ry, is often present
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lence, whether th… …etained in them b
suddenly, and th… …stances the veins and
such causes … …us.
even in its … …t is frequently soften
dent hav…
of sudd…
scarlati…
brain.
second…
irritat…
and …

B…
cas…
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…eal lesions may belong
… the latter is distinguish
…tubercle, which is found
…he arachnoid, and someti
… the same heterologous
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… simple and tubercular ence
…ght be concluded that th

portion as the patient is free from a tubercular taint is the prospect of a cure, whether we are called in during the forming stage or not until the disease is fully developed. In both varieties, cases which have a long and stealthy access are at least amenable to medicine. It is not easy to say what should be done during that stage, except to obviate every discoverable exciting cause, whether it be external or internal and pathological. In some cases the arterial excitement never rises high, and an active antiphlogistic treatment seems inadmissible. Purging, minute alterant doses of calomel, a few leeches to the head, cool applications subsequently, and occasionally small blisters to the ankles and nape of the neck, dressed with emollient poultices, comprehend the whole treatment.

In cases more acute and violent the same remedies may be employed in larger measure. I may say a few words on each. The lancet is indispensable, and when, as sometimes happens, it cannot be employed in the arm, the jugular vein should be opened; but the child should not be bled to syncope. The venesection may be repeated once, and in a few cases oftener, when leeches should be employed. Experience has taught me, however, that when this inflammation is developed in a tubercular constitution, the results of copious bloodletting are by no means satisfactory, although the existing symptoms may seem to require it. Of the safety and probable benefit of active purging in this state of the system there can be no doubt. But many physicians have placed their chief reliance on calomel, and the outward application of mercurial ointment. I have seen this treatment carried very far, but am not prepared to commend its unlimited employment. The object is to excite a mercurial disease which shall set aside the other. It is, however, extremely difficult thus to affect the system of small children, and when successful, the danger of sloughing ulceration or gangrene of the mouth is great. Nor can I approve of the extent to which blistering is sometimes carried in this affection, especially when the cuticle is removed and irritating unguents are applied instead of soft poultices. The nervous systems of children are too susceptible to justify such irritation. It may be said, however, that the patient without these means will die, and they may do good; but on the other hand it may be said that with them they generally die, and that it remains yet to be determined whether as great a number would not recover under a milder process of medication.

That the systems of little children are easily brought, by copious bleeding, purging, and extensive blistering, into a state of severe and often fatal irritation, I have no doubt; and therefore believe that they, more than adults, require the early administration of gentle opiates and diaphoretics, with the tepid bath.

In the earlier stages of the disease, the occurrence of a convulsion need not excite very deep concern; but in the more advanced stadia, that symptom, with paralysis, dilated pupil and coma, presents a case which may be expected to prove fatal, and it signifies little what may then be done, as from the insensibility of the patient the harshest measures are perhaps not felt.

question, it can signify little or nothing to the head we are now under. I
seated. Whether simple or tubercular symptoms, observed and recorded with
not always present, and the membrane. Notes, 1st Series, Vol. 7, p. 101,
rally more copious than in the enc
depends on two causes; *first*, the [illegible] at birth, had the aspect of a sa-
early, or forming stage, in which [illegible] displayed early intelligence
with but little or no fibrine, [illegible] of a costive habit. In the
the patient is young; for it [illegible] eleven months old, he was attacked
elements relatively predominate, [illegible] accompanied with slight fever, for
secretion has been found in [illegible] and other sedative expectorants, under
arachnoid sac, the [illegible] became seriously ill. His cough continued
base of the brain, [illegible] him more by night than day, and often
The next secretion [illegible] character, but without the characteristics of
mation, and [illegible] then epidemic. The feverishness of the
opaque; but [illegible] respiratory sounds were perfectly normal.
plexus choroide[illegible] lived chiefly at the breast. The latter part
the serum, [illegible] cough, but losing flesh, and extremely fretful
Purulent [illegible] its of crying. His bowels had now become
and I hav[illegible] few days of May, these symptoms were more
A st[illegible] languid and haggard. On the morning and
of the [illegible] that month he was observed to be unnaturally
seeme[illegible] ing night he was restless, but the next day and
from [illegible] drowsiness. On the sixth, it was difficult to
exc[illegible] days his pulse had been about ninety in a minute
an[illegible] irregular while asleep. He had neither febrile
[illegible] bowels were open without the use of medicine. On
tl[illegible] grains of calomel, and slept through the day with
[illegible] tranquil and almost inaudible. In the afternoon he
[illegible] evacuation. Not being relieved from the drowsi-
[illegible] to the extent of six ounces, which brought on vomit-
[illegible] with a strong tendency to syncope for an hour. The
[illegible] was a little milky, and the clot displayed a slight degree
[illegible] yellow evacuation followed the bleeding, after which
[illegible] bath, and appeaing much exhausted, took a small dose
[illegible] lay all night without moving or waking up, but had no
The next day (May 8th) continued in the same condition.
[illegible] grains of calomel were administered, which was followed
[illegible] one green the other yellow. In the evening his pu[illegible] se
[illegible] a little febrile heat. Granville's liniment was appl[illegible] ed
[illegible] is neck till it raised a few small blisters. At bedtime [illegible] he
[illegible] From 11 P.M., till 6 o'clock, P.M., of the next day
[illegible] position apparently asleep. At the latter hour he was
[illegible] some fever. Took the breast, as he had done before, but
[illegible] anything. A blister was now applied to his neck, and amo-

ther dose of calomel administered. In the afternoon eight leeches to his temples, bled freely. Another dose of calomel was exhibited, and followed by an infusion of spigelia and senna. A slight perspiration followed. At 10 P.M., had one evacuation—no worms. The medicines were continued, and the blister poulticed. Pulse 108. Takes notice of some things. Morning of the 10th. Has had no evacuation. Seems more awake, and a little thirsty. Takes things in his hands and applies them to his mouth. Pulse variable between 94 and 100. Took castor oil and oil of turpentine. One P.M., has had an evacuation—no worms. Quite awake, skin cool and no thirst. At sundown, comatose, pulse extremely irregular and variable, sometimes remarkably full, constantly soft. Eight leeches were applied to the upper part of the forehead; bleeding, but moderate. Gave ten grains of calomel. At 8 o'clock, on a careful examination, the sounds of the heart were loud, its impulse feeble; the resistance of the carotid, temporal, and brachial arteries was small. With all this enfeeblement of the more central parts of the apparatus of the circulation, there was in his fingers and toes, especially the former, a strong, vibratory pulsation, perceptible to their very extremities, which, in fact, I had accidentally noticed, in a slighter degree, the day before. It was synchronous with the pulse, and arrested by compressing the brachial artery. His skin was of a natural and uniform temperature; his tongue clean, and his gums healthy in color and fulness. 11 P.M. At 9 had an evacuation of mucus, mixed with bile. Now lies comatose, and cannot be roused. Pulse 90 to 108, soft and irregular. Warm bath and blister to the crown of the head. May 11th, morning. Somewhat restless, pulse more frequent, constant rubbing of his nose and left ear with his left hand. At 9 o'clock, an evacuation of the same kind with the last —no worms. Pulsation in his fingers as before, and their ends red. 10 o'clock. Pulse 116, no flush of fever, no thirst, skin soft, comatose and quiet. A dose of calomel and ipecac.—vomited twice. 11 P.M. Comatose throughout the afternoon and evening. Pulse of continued variability, ranging from 90 to 110; skin natural, countenance soft and quiet. Blister over the parietal and temporal bones. Broken doses of calomel and ipecac. 12th, 9 A.M. From 12 to 5 A.M., his breathing a little laborious, vomited several times; at this time his pulse 132, irregular, and sometimes intermitting after every fourth beat, deeply comatose; no medicine. At noon, had an injection which operated. At two, dressed the blister on his head, which had drawn well. 4 P.M. For the last two hours has been most of the time awake, manifestly sees and hears, and displays muscular movements indicative of attention. Countenance tranquil, with a very soft and pleasant expression; sometimes evidently *looks* at things presented, but generally his eyes are in a fixed direction; his left hand, which was yesterday in almost constant motion, is to-day still, and his right is perpetually moving in an idle chorea-like manner. Pulse 120, and perfectly regular. Drinks what is offered to him. 9 P.M. A tepid bath, and blister between

VI. The following case seems referable to the head we ar
propose to append it here, because its symptoms, observed a
care, present several anomalies. (Med. Notes, 1st Seri
A.D. 1841.)

D. M., a male infant, was well developed at birth, had
guine-lymphatic temperament, grew rapidly and displa
with fine moral dispositions. He was generally of a
month of February, 1841, when he was eleven mon
with what seemed a catarrhal cough, accompanie
which he took gentle antimonials and other sed
which he neither got well nor became seriously i
through March and April, affecting him more by
assuming a kind of paroxysmal character, but w
pertussis; nor was that disease then epidemi
commencement ceased, and the respiratory so
His appetite was regular, but he lived chiefly
of April found him with less cough, but losi
and discontented, with long fits of crying.
more regular. In the first few days of M
urgent, and his aspect became languid an
forenoon of the fourth of that month he
dull and sleepy; the following night he
succeeding night had extreme drowsine
arouse him. For several days his pul
—regular when awake, and irregular
heat nor thirst, and his bowels were
the seventh, he took six grains of
breathing (as before) tranquil and
had one copious yellowish evacua
ness, he was now bled to the ex
ing, and left him with a stro
serum of the blood was a little
of siziness. A second yellow
he was put in a tepid bath, an
of paregoric. He lay all nig
perspiration. The next da
In the morning five grains
by two evacuations—one g
was 112, and he had a litt
to the back of his neck ti
calomel was repeated.
(9th) he lay in one posi
found to have some fe
would not notice anyth

[illegible] I
[illegible] ive desig-
[illegible] the brain
[illegible] it is mild
[illegible] t in, and
[illegible] pulmonary disease
[illegible] little patient seemed
[illegible] The costive habit of
[illegible] cted under an affection of
[illegible] ic fever, and his system was
[illegible] thesis was of the lowest grade
[illegible] l symptom; but why should
[illegible] pupil be absent? I can only
[illegible] n, and slow, serous exfiltration, by
[illegible] ssion of the brain was brought about
[illegible] ventricles, and equal on both sides
[illegible] abatement of coma and the integrity of
[illegible] ly the day before his death? This has
[illegible] a precedent is not an explanation. I can
[illegible] cerebral compression might have depended
[illegible] and, at the time of which I speak, it might
[illegible] Its recurrence the next day might have
[illegible] of death. Such fluxionary congestions are not

The singular movements of the extremities, a sort of compound of subsultus tendinum and chorea, occurring first on one side, then on the other, and then on both, with the periods of fixed direction of the eyes, seem to have been the equivalents of the spasm and partial paralysis, so characteristic of the last stage of ordinary subacute encephalitis. The redness and vibratory pulsation of the extremities of the fingers and toes, I would ascribe to a tubercular diathesis. They seemed to me exceedingly like the affection of those extremities, so often met with in the closing stages of phthisis; and, more fancifully, I would refer the placid and almost smiling aspect of the little patient in the last days of his illness to the influence of the same temperament on the mind and moral feelings of the patient. We often see the same aspect in those who are dying of tubercular consumption.

The inefficacy of our received method of treatment was fully shown in the progress and termination of this case. The bloodletting, judging by the quantity drawn compared with the age of the patient, and by its immediate effects, was carried to its admissible limits without any benefit. It must be admitted, however, that if it had been employed several weeks before, the result might have been different; yet at that time the child showed no evidence of a phlogistic condition, and was not indeed regarded as requiring treatment. Calomel, purgatives, and blisters were all employed extensively, but with no permanent and little apparent benefit. The blisters only seemed once or twice to mitigate the symptoms. Finally, assuming this to have been a case of that form of disease to which we have devoted this section, we see how insidiously it may establish itself; and how fruitless in some cases may be our curative efforts, although begun as soon as any ordinary signs of encephalic disease appear.

CHAPTER IX.

INFLAMMATIONS OF THE NERVOUS CENTRES—BRAIN AND SPINAL MARROW CONTINUED—MYELITIS AND CEREBRO-MYELITIS.

SECTION I.

SPORADIC MYELITIS—PARENCHYMAL AND MENINGEAL.

I. Prevalence.—1. No organ of the body is as well defended against the direct action of mechanical and other external causes of disease, as the spinal cord. Compared with the brain it enjoys a high degree of security. It would not be difficult to show that the osseous case in which it is enclosed

casualties, connected with the destruction of our forests, the construction of houses and public works, and the handling and exportation of countless tons of agricultural produce annually;* and this rarity, I think, must be chiefly ascribed to the sources of anatomical and physiological sources of immunity which have been pointed out.

II. Myelitic Irritation.—While inflammation of the spinal cord is a rare affection, irritation of that organ is regarded by our profession as a common disorder. This opinion has been gaining ground for the last twenty years, not, I apprehend, from any increase of that malady, but from the attention of physicians having been more directed to the spine than formerly; and from many disordered functions of the heart, lungs, and stomach, which were once held to be primary irritations of those organs, being now regarded as secondary, and dependent on myelitic irritation. The proper place to discuss this subject is that assigned to the neuroses, but as irritation frequently eventuates in inflammation, and as the distinctive diagnosis in many cases presents much difficulty, it is necessary to refer to it here. That the nervous matter in whatever part of the body or under whatever form it may exist, can be thrown into a morbid condition without the coexistence of capillary hyperæmia cannot, I think, be doubted. To this condition taken in the concrete (for a distribution is impossible) we may provisionally apply the term irritation, which used metaphorically, involves no hypothesis. As the irritation happens to be seated in the nervous matter appropriated to sensibility, or to mobility, the morbid phenomena resulting from it will be those of sensation or motion; and when it occurs in nerves, or at the origins of nerves presiding over the nutritive functions, the symptoms will be found in their disordered condition. Now the spinal cord is not only made up of nerves of sensation and motion, but sends twigs into the ganglia and plexuses of organic life. Still further, it seems to give origin to most of the nerves which combine and bring into coetaneous action the numerous muscles of respiration. Here, then, is a broad foundation for the symptoms of what, in the popular language of the profession, are inaccurately called spinal irritations. Varying according to the seat of the myelic irritation, a chapter would be necessary to a full enumeration of them. In the organs of sense, morbid sensibility of the eye and ear; in the apparatus of locomotion, pains, soreness, numbness, cramps, sometimes spasms, badly directed voluntary movements, and reduction of energy; in the muscles of respiration, convulsive, paroxysmal cough, and feeling of constriction; in the heart, palpitations; in the stomach, gastrodynia, and flatulence, and variable appetite; in the bowels, constipation; in the kidneys, increased and limpid secretion. These, however, are but specimens of the groups of symptoms which are assumed to depend on myelic irritation. In many cases, doubtless, the spinal cord is not in fault; in others affected secondarily but reactively, giving birth to added symptoms.

* See Vol. I., Book I., Part III. Chap. IV.

decide that the cord is the seat of irritation? To declare
of these symptoms would be a *petitio principii*, yet if
ced by measures addressed to the spine, we acquire pre-
f such an origin. The absence moreover of the signs of
mmation, or any anatomical lesion in organs, the functions
disturbed (as for example the sounds of the lungs being natu-
ist of a convulsive and persisting cough), will afford further
proof. Finally, a state of morbid sensibility or tenderness of
of the spine, under pressure, and especially a momentary in-
symptoms in distant organs during such pressure, will, the
of diagnosis concurring, generally lead us to a correct conclu-
it is true, to the conclusion that a simple "nervous" irritation,
morbid condition of some part of the cord is present. It will,
remain to decide whether it be non-phlogistic irritation or inflam-
d this cannot always be easily done. Pressure as a general fact
pain in both cases; but under strong pressure or violent percussion
ortuous motion of the spine, the pain will be more increased when
tion is present than when it is absent. In making this pressure,
st never forget that when there is no disease of the cord, there is a
legree of relative tenderness about the fifth and sixth dorsal vertebræ,
ding with the physiological intolerance of pressure found in the
rium. The sponge dipped in hot water is perhaps of more value in
agnosis than pressure. It may not always increase the pain when
there is myelitis, but when it does have that effect inflammation is more probable than mere irritation, as we find in external parts the inflammatory pains increased by heat, while the non-inflammatory are generally abated. The sex of the patient may aid us, for women are more subject to irritation, men to inflammation. The temperament and constitution of the patient must not be overlooked. In the sanguineo-bilious we may look for inflammation; in the nervous and lymphatic for irritation. Again, the symptoms are (irregularly) remittent or even intermittent in irritation, more persistent in inflammation. But finally, the absence of fever in one case, and its presence in another, with the general signs of a phlogistic diathesis, including a buffy coat of the drawn blood, will justify the diagnosis.

III. Inflammation within the spinal column may be seated either in the cord or its meninges, or both at the same time. It is often complicated with cerebro-meningitis. Spinal meningitis is more acute and violent than myelitis or inflammation of the cord itself. The prominent symptoms are fever, severe pain in some part or the whole of the spine, sometimes passing gradually from one part to another, in many cases pains in the head, the parietes of the chest and abdomen, also in the muscles and joints of the extremities; opisthotonos, and tetanic contractions of various muscles, spasms, subsultus, and partial paralysis. When the inflammation is seated chiefly in the cord, the pains and fever as intimated are less acute, but as

the tendency is to softening, paralysis occurs at an earlier period and is of greater extent. Dyspnœa, dysphagia, and retention of urine are often present in both.

When these inflammations are violent and rapid, they can easily be distinguished from irritations, but in their milder forms such discrimination is often difficult, sometimes, indeed, impossible till the disorders of sensation or motion, which arise from slow but fatal lesions of structure, show themselves.

These anatomical derangements are hyperæmias and ecchymoses; serous or sero-sanguinolent effusions beneath the arachnoid; fibrinous deposits on the surface of the cord; lymphatic adhesions of the arachnoid surfaces, suppurations, which seem to be comparatively more frequent than encephalitis; finally, when the inflammation originates in, or penetrates the cord, softening of sections, or even its entire length. It is remarkable that in some cases the cord becomes diffluent, and yet *voluntary* motion in the parts below is not destroyed; from which we learn that the cohesion of vital affinity may be reduced or annihilated without abolishing the function of transmission in the living atoms, while they are kept in mechanical contact.

IV. Treatment.—Acute inflammation of the spinal cord and its membranes, or either, must be met by the same means as acute encephalitis. In estimating the condition of the system we must not forget that the influence which the cord exerts over the movements of the heart, may sometimes prevent the development of a true phlogistic pulse, and throw us upon pain, increased by motion, pressure or heat, and spastic contraction of the muscles, as evidences of high inflammatory orgasm.

1. The first and most important remedy is bloodletting, which in many cases must be carried to a great extent; and when venesection seems no longer admissible, cupping may be employed. In mild and chronic cases, the local detraction of blood may of itself be sufficient.

2. Purging ranks next to bleeding. Copious secretion and excretion from the bowels is in fact local depletion from the spine; while the irritation of drastic cathartics effects a most beneficial revulsion from the inflamed organ. Calomel, followed by the compound powder of jalap, or the podophyllum peltatum, or an infusion of senna with sulphate of magnesia, is the most efficient means of purgation. The evacuations should be chiefly effected in the evening, and followed at bedtime

3. By Dover's powder and calomel. This compound, after free bleeding and purging, fulfils three indications. The calomel acts as an antiphlogistic alterant, the opium allays irritation and diminishes the spasticity of the muscular system, and the ipecac. in connection with the opium determines upon the surface of the body and makes revulsion from the spine. The objection to opium in encephalitis, does not lie against that medicine in myelitis, while the greater prevalence of spasm in the latter renders it peculiarly necessary.

Throughout the whole treatment of chronic, not less than acute myelitis, a recumbent position will be proper, and great muscular effort of every kind should be avoided.

SECTION II.

EPIDEMIC CEREBRO-SPINAL MENINGITIS.

I. HISTORY.—We have, thus far, been occupied on *sporadic* inflammation of the membranes and medullary substance of the brain and spinal cord; but it sometimes occurs as an *epidemic*, and then requires a separate examination. It is remarkable that this epidemic should have been first noticed in our Interior Valley and on the Continent of Europe about the same time—1840–41. It appears, however, from retrospective inquiry, that it had prevailed in Europe long before, though described under various names, none of which suggested its true character. It has never fallen under my own observation. It has not, I think, been described among the epidemics of the Atlantic States. Of its occurrence in our Interior Valley, I have met with the following notices.

In the month of January, 1842, it commenced as an epidemic in Rutherford County, Tennessee.* About the same time it began rather sporadically at Montgomery, Alabama;† becoming decidedly and suddenly epidemic in the month of February, 1848, and ceasing with the month of May, to reappear soon afterwards on some of the surrounding plantations.‡ In the autumn of 1845, and the following winter, it prevailed at Mount Vernon and other places, in Southern Illinois.§ In the month of January, 1847, it appeared at Vicksburg, Mississippi, and continued till the close of March.‖ In Hardaman County, West Tennessee, it appeared in February, and continued through the spring.¶ In 1846–7, it was observed at Bentonville, Arkansas;** and at the same time cases appeared in Union County of that state.†† In January and February, 1847, a regiment of United States recruits, from the State of Mississippi, suffered severely from it in the vicinity of New Orleans,‡‡ and in February, 1850, it was observed to some extent among the population of the city.§§

All of these localities lie South of the thirty-ninth parallel of latitude, and most of them have a winter mean temperature corresponding to that of

* John W. Richardson, M.D. Western Journal (Louisville) for December, 1842, p. 430.
† W. W. Boiling, M.D. New Orleans Med. Jour. for May, 1847, p. 732.
‡ S. Ames, M.D. Ibid., Nov. 1848, p. 295; also, in a separate monograph, Montgomery, Ala., 1848.
§ J. C. Gray, M.D. Western Lancet for May, 1846, p. 14.
‖ B. J. Hicks. New Orleans Med. Jour. for July, 1847, p. 53.
¶ B. F. White, M.D. Ibid. p. 49.
** Dr. Bell. West. Lancet for Nov., 1847, p. 227.
†† Dr. Charles Chester. N. O. Jour. for Nov., 1847, p. 314.
‡‡ Thos. N. Love, M.D., Surg. U. S. A., New Orleans Jour. for July, 1848, p. 3.
§§ E. D. Fenner, M.D. South. Med. Rep., vol. ii. p. 17.

account is that given by Dr. Ames, whose paper is, in fact, an excellent monograph of the epidemic, while the others are but brief, yet significant and instructive notices. His account embraced eighty-five cases, sixty-four of which were subjected to a regular analysis, which my limits, however, do not permit me to follow out.

All our observers have seen this disease commence and advance in a mild and gradual manner, and also with suddenness and great violence. Most of the symptoms are found in the functions of sensation and motion. In a great majority of cases, the onset was with pain, always in the head, but likewise in various parts of the body, as in the neck, and, indeed, the whole length of the spine, and in the muscles and joints of the extremities. It frequently changed its place, except when located in the head and neck. In many instances it was of the acutest kind, and in some patients there was such a general morbid sensibility that the slightest touch would make the patient start with a kind of general spasm, as in hydrophobia, and scream out with pain, which he could not refer to any particular part. When the pain did not give place to coma, it often continued to the close of the disease, especially in the head and neck. The latter was often tender to the touch, and in some patients pressure over the cervical vertebræ caused an acute pain to dart from that part into the head and eyes, and when made lower down gave pain in the sternum, the epigastrium and the abdomen.

In some patients there was coma on the first day, which ceased and recurred; in others it set in at a later period. When it did not remit, an early and fatal termination occurred.

Delirium was generally present. It sometimes began with the disease. It was either mild and muttering, or furious, even to a kind of maniacal frenzy.

The pupils were sometimes contracted, in other cases dilated, and in some, one was in the former, the other in the latter condition. In a few there was temporary blindness; in many double vision. In a few cases the senses of taste, smell, and hearing, were impaired or lost.

From the beginning there was also great muscular weakness, and in some patients tremors, twitchings, or perpetual motion of the limbs. The muscles most affected, however, were those of the trunk of the body, which experienced those tetanic contractions, which, in fact, constitute the most pathognomonic symptom of this malady. In some cases there was trismus, and in a few emprosthotonos; but in the majority the extremities of the spine were thrown backwards till it was bent like a bow, constituting opisthotonos. This curvature did not in general begin with the attack, but appeared in various stages of the disease. In a few patients there was spastic rigidity of both the flexors and extensors of the head and neck, so that no motion could take place, and the same condition of a limb was occasionally seen. General convulsions occurred in many cases.

ataxic fever, and no two of the reported cases present the same combination or succession of phenomena. Its true diagnosis consisted in the pains of the head, neck, back, and limbs, almost continuous in the first, and changing from place to place in the last; in the delirium and coma occurring and ceasing in various stages of the malady; in the spasticity of the muscular system (of animal life) generally, and above all, in the tetanic contractions of the muscles of the trunk, giving to the upper extremity of the spine a backward, forward, or lateral curvature.

III. PATHOLOGICAL ANATOMY.—We are indebted to Dr. Ames for nearly all that we know of the anatomical lesions produced by this malady as it appears in our Valley.

1. *The Blood.*—Of thirty-seven cases in which he noted the appearance of the drawn blood, the coagulum was generally large, loose, and of a color approaching to that of arterial blood. It was buffed in four only. He analyzed that drawn from four patients (but does not say whether they were those just mentioned), and found the corpuscles increased in one, diminished in another, and natural in two. In all there was an excess of fibrine, the maximum being double that of health.

2. *The Brain.*—Eleven of those who died were subjected to anatomical inspection. In two cases the dura mater showed spots of capillary congestion; in the whole the pia mater was in the same condition. The walls of the ventricles displayed patches of capillary hyperæmia, resembling ecchymoses. In some the arachnoid was here and there thickened and opaque.

The hemispheres of the brain, with but one exception, were in a state of congestion, and the blood in some of the larger capillaries was coagulated. In the exceptional case the gray substance was of a uniform pink color, and spots of a similar hue were found in the white matter. The medulla oblongata, in two cases, was dotted internally with dark ecchymosed spots. The cerebellum participated to a greater or less extent in these hyperæmias in every subject. In some cases the membranes presented spots of softening. In nine cases a similar lesion was observed in various parts of the brain, both cortical and medullary. The hemispheres, medulla oblongata, pons, fornix, septum lucidum, ventricular walls, corpus callosum, the striated bodies, the crura cerebri, and the cerebellum are among the enumerated parts. In the last organ there was red softening, which seen through the membranes looked like ecchymosis, and the disorganized mass examined under the microscope showed blood, lymph, a trace of neurine, and pus, which largely predominated.

In ten of the eleven cases there was subarachnoid effusion. The fluid was of a yellowish color, and presented abundance of pus and lymph corpuscles. In some the lymph was sufficient to impart a certain degree of cohesiveness, with a tendency to organization. It often seemed like a layer of cream spread over the hemispheres; but was most abundant at the base of the brain, and above all, about the optic commissure. Finally, in a number of cases it

ad the cerebellum. In nine cases a similar effusion was found in hnoid cavity; and in one subject there was a well-organized false ie. In four others the same lymphy sero-purulent secretion was n the ventricles.

dated fibrine was found in the branches of the internal carotids, the rtery, and the longitudinal sinus with its supplying veins, in a few

Spinal Cord.—Unfortunately but few examinations were made of rgan. The lesions which they presented were the same as those found brain in the same subjects. The intense vascularity of the pia mater vays present; but the lympho-purulent effusion was less common than brain. In one subject, e ion of the cervical section of the softened, and the lesion sd in a diminishing degree into the In the same case the spinal a mater had the color of muscle. s subject the morbid effusion was iefly about the roots of the ante- rvical nerves.

The Abdominal Organs.—These re examined in five cases only. In the whole, the mucous membrane of the omach was more or less reddened, thickened, and softened. In four of ive subjects there were lesions of both the solitary and agminated glands the lower part of the ileum. In one who died on the second day, they were swollen, roughened with granules, and elevated a line and a half above the surrounding membrane, which near them presented arborescent capillary congestions. The mesenteric ganglia corresponding to this portion of the bowel, were red and enlarged. There were no abdominal symptoms in this case. In another, who also died on the second day, the state of the bowel was nearly the same, but the ganglia of the mesentery were not altered. A great many lumbrici were found in this case, the only abdominal symptom in which was acute pain on the first day. The third case terminated on the fourth day. The lower part of the ileum, through four feet, was examined, and the whole of its mucous membrane found more or less thickened, reddened, and softened. Many of the patches of Peyer, and a great number of the solitary glands, were elevated, and wore a granular aspect; and the cellular tissue beneath was thickened and softened. The mesenteric ganglia were normal. There were no symptoms of abdominal disease in this case. The fourth subject, death having occurred on the fifth day, presented, in the membrane of the ileum, a great number of nodules, which were the solitary and aggregated glands enlarged. Many of both, moreover, had passed on to a state of ulceration, and others seemed to be transformed into crude tubercular matter. The surrounding mucous membrane had a rose color. The mesenteric ganglia, corresponding to the affected part of the ileum, were enlarged, of a dark red color, and softened. There was neither vomiting nor diarrhœa in this case. On the third day, being costive, he had abdominal pain, with tenderness on pressure, and some tympanitic distension, which were entirely removed by the operation of a cathartic.

Of the state of the other organs of the abdomen, and those of the pelvis and chest, nothing was reported.

Dr. White made one *post-mortem* inspection, the patient having died after an illness of three days. The membranes of the inferior parts of the brain were thickened, injected, and opaque; the ventricles contained from two to three ounces of transparent serum, and the lower portions of the middle lobes of both hemispheres, were softened. On opening the spinal canal and puncturing the membranes, a considerable quantity of fluid blood escaped. The meninges were thickened and congested. The substance of the cord was uninjected, but seemed slightly softened. The lungs and heart were normal, but the pericardium contained two ounces of serum. The lower portion of the ileum displayed a few spots of ecchymosis, and the liver was enormously engorged with blood. The other organs were normal, except a little enlargement of the spleen.

Dr. Hicks made but one (hurried) examination. The cerebrum and cerebellum showed no signs of disease, but the meninges of the medulla oblongata and upper part of the spinal cord were highly engorged, and the substance of those organs presented dots of blood.

Dr. Chester, in a single examination of the brain only, the disease having after its first stage assumed a typhoid character, and terminating on the 24th day, found the substance of the organ sound; but the pia mater was deeply injected, and in its posterior part even engorged with blood. Between that membrane and the arachnoid there was a bloody serum, and an effusion of the same into the ventricles.

Dr. Bell, of Arkansas, in some examinations, saw extensive suppuration around the medulla oblongata.

As the autopsies made in this country have not been numerous, it may be well to inquire how far they correspond in results with those made in Europe. Without quoting authorities, most of which I have only at second-hand, I may say that the morbid appearances produced by the disease on the two continents, are almost identical.* Thus, the fibrine and corpuscles of the blood (in four cases) were considerably augmented; the lungs were generally sound; the glands of the ileum were often diseased, but in a great number of cases, normal; the condition of the stomach was variable, but the cranio-spinal organs were always in a state of lesion. This was expecially true of the meninges. Hyperæmia, softening, and effusions of serum, or sero-fibrinous fluid, or of pus, generally mingled with the others, were the common results. The last figures more strikingly in the autopsic reports of that country than our own; and has even been regarded as the great pathological characteristic of this epidemic. The seat of the disease, in both countries, was the cranial and spinal organs, though it did not *always* affect both. I see nothing to justify the hypothesis, that the affection of the spinal cord or its

* Am. Jour. Med. Sc. for April, 1843, p. 458, Oct. 1845, p. 662, and Jan. 1847, p. 152. See also the excellent lecture of Dr. Bell, Vol. II. 3d Ed. p. 427, and the art. Epidemic Meningitis in Dr. Condie's valuable treatise on the Diseases of Children, p. 408.

overspread the ... a mere accidental extension of the the arachnoid ... downward. membrane. In ... found in the ... Coagulated ... basilar artery, ... cases.

3. *The Spl* ... perhaps refer the remissions, so often this organ. ... in the brain in ... with periodical fever. But shall was always pr... and occasional intermissions of in the brain. ... the same physiological law? I think cord was softe... those of sporadic meningitis. *Second*, dorsal. In the ... In this subject ... ly in localities where the cause of ... ular or remittent character to many diseases ... for cervical ... Thus, in these insalubrious situ... 4. *The* ... pneumonia and other phlegmasiæ, typhus the whole. ... a manifest intermittence. *Third*, many thickened. ... which are almost identical with those of both the ... When giving the symptoms of the dis... one who ... having glanced at its remitting tendency, reserv... and eleven ... near them ...

... tetanic spasms preceded for two or three glia... ... case it was intermittent and of a tertian Ther... ... the cerebro-spinal symptoms, the fever was on t... ... some cases, the tetanic spasms abated and in... glia... ... another. both were distinctly intermittent at the in ... ... marked with a decided morning intermission, first ... ... exacerbation. Dr. Chester states that in the the ... ... was regularly intermittent. Dr. Scruggs, also, me... ... He saw a patient so ill in the first paroxysm th... ... intense opisthotonos; yet the next morning she va... ... at a second paroxysm in the afternoon proved er... ... well after a day of excruciating headache, that sy... ... paroxysm ended in death. Finally, Dr. Ames, o... ... regular remissions; in others they were n... ... referred both to the fever and the cerebral affection. ... that Dr. Love informs us, that while the ... severely afflicted by the epidemic at New Or... ... encamped on the same bank of the river ... the whole were new recruits, but the latter ... blessed with autumnal fever, while the former ... suffers.

... that our epidemic spinal meningitis, ac-

tually arose from the same cause with autumnal fever. No doubt some other cause existed, which acting on systems previously impressed by that agency, the symptoms, type, and treatment were modified accordingly.

This was not the only form of complication. We have seen that in general the lungs were unaffected, yet, occurring when catarrhal disorders were prevalent. Dr. Scruggs saw bronchitis with bloody sputa and dyspnœa, associated with supervening and fatal opisthotonos, and Dr. Ames saw three examples of the same complication. Dr. Richardson, where measles had been epidemic a few months before, frequently observed cases in which there was an eruption of "red specks" on the forehead, breast, and arms. Dr. Gray met with sore throat and a "fiery eruption," which he regarded as scarlatinous, in connection with opisthotonos, and deathlike rigidity of the limbs; but he does not tell us that scarlet fever had previously prevailed in the same localities. At Montgomery, roseola had been just before epidemic, and Dr. Ames saw seven patients who had lately passed through that disease, affected with inflammation of the fauces, while laboring under meningitis, and two others, had both diseases at the same time.

Of the relations between this disease and epidemic erysipelas,* something must be said. They were both in existence, as limited, or subepidemics, in the southern portions of our Valley through the same period, that is from 1840 to 1850. Here and there they affected a town, village, or plantation, passing by a far greater number; they both prevailed chiefly in the winter; and finally in both there was a strong tendency to purulent secretion. It does not appear that both prevailed, in their proper diagnostic characters, at the same time and place; or that one was ever the *immediate* successor of the other. The epidemic erysipelas sometimes commenced in the deep-seated cellular or mucous membranes, and made its way to the skin, *from* which in other cases it extended to the membranes of the brain, where its ravages were not unlike those of epidemic meningitis. Now, if we suppose, erysipelas in certain localities and times, to have commenced in the cerebro-spinal meninges, we should apparently have the very disease we are now studying, for the pseudo-inflammatory type was common to both.

The relations between epidemic meningitis and the typhous epidemics, which have prevailed through the same regions of country since 1840, must not be overlooked. In the restriction of the two diseases to very limited localities, they were quite identical, and in their invasion of the nervous system equally so, though they did not make their attacks in the same mode. Yet many cases of epidemic meningitis became protracted, and put on the garb of typhous fever, a dark and dry tongue, subsultus, low delirium, and petechiæ or other maculæ of the skin, characteristic of that fever. The morbid appearances of the brain and its envelopes were much alike in the two maladies, and in several subjects of the epidemic we are studying, there was tumefaction of the glands of the ileum; facts which show that it was to a certain extent modified by the cause which produced the typhous fevers.

* See Chapter on Erysipelas.

membranes, is, as has been suggested, a mere [illegible] between cerebro-spinal disease from the cavity of the cranium down[illegible] the northern latitudes

IV. Modifying Influences and Conti[illegible] and traumatic as [illegible] bro-spinal meningitis, has, in every locality [illegible] meeting with a single case. ysmal or remittent character, a trait wh[illegible] ing there, I found young may doubtless be taken as a law, that all [illegible] cases than I had seen at functions, of the nervous system of a[illegible] the tetanus of adults; but mittence. To this tendency we may [illegible]. A part of this diffe- seen in sporadic and primary inflamm[illegible] of blacks in the South, a common causes, in localities not inf[illegible] whites; the remainder to the we, therefore, wholly refer the re[illegible] are there more subject to all the fever we are now considering. [illegible] Now, as we have seen, epi- not; for, *First*, they are greater [illegible] prevailed only in the South, and it the disease has prevailed exclu[illegible] races. Here then are two tumnal fever imparts an intermi[illegible] of these diseases, epidemic remit- which in other localities are [illegible] more strikingly etiological, may tions, it is not uncommon to [illegible] exposure to a damp and cool atmo- fever, and yellow fever, d[illegible] a great exciting cause of both idio- cases have presented sym[illegible] Love, ascribes much of the fatal malignant, ataxic intermi[illegible] among the Mississippi troops, to ease we are now studying, [illegible] sleeping in wet blankets, on ground ing for this place a follo[illegible] New Orleans. The Pennsylvania

Dr. Boling generally [illegible], which was from a higher latitude, days by remittent fever. [illegible] supplied with woollen apparel, as type. After the devel[illegible]. A bad and innutritious diet has regularly remittent; [illegible] tetanus, and seems to have creased with the fever. [illegible] Mississippi recruits, for they had just same time. Dr. G[illegible] and were not reconciled to the army or remission, and [illegible] prepare nor the appetite to eat. "second stage," [illegible] of the two diseases, we *might* almost observed its in[illegible] or febrile, idiopathic tetanus; but I that she was p[illegible] any further than to recognize the causes seemed likely [illegible] favored the production of epidemic fatal. A yo[illegible]

he went abro[illegible]—After giving to climate, race, ex- in a great n[illegible] influence which I think should be quotidian or [illegible] some undiscovered agent, witho[illegible]

In this [illegible] not become epidemic. In this Mississipp[illegible] category with many other epidemics leans, the [illegible] Asiatic cholera, and erysipelas. Wha[illegible] hard by, [illegible] more believe that it begins its action o[illegible] were fro[illegible] an inflammation, and that inflamm[illegible] were fro[illegible] of remittent fever, scarlatina, epidemi[illegible]

We m[illegible] epidemics, commence their action on the[illegible]

spleen, the skin, the peritoneum, and the brain. In these cases, and in that now under examination, a lesion of innervation, made, we know not where, is followed by another of the circulation, giving us, simultaneously, both fever and inflammation. Each of those fevers and the accompanying inflammation has a peculiar type and character, and a locality of its own; but both the types and locations are subject to a modification and displacement from causes not always perceived by us, and, therefore, the same epidemic does not always present the same phenomena during life, nor the same seats of lesion after death.

Our cerebro-spinal fever was inflammatory; but its diathesis was not *highly* phlogistic. The hyperinosis of the blood was not great, as appears not only from the experiments of Dr. Ames, but from the general absence of buff on the drawn blood, and the frequent failure—sometimes injurious effect—of the antiphlogistic treatment. The inflammation partook of the character of simple congestion, and did not bring forth the products which characterize the more exalted grades of inflammatory action. The lymph thrown out was imperfect, often greatly diluted with serum, and much adulterated with pus, to the generation of which there was so great a proclivity as to indicate a lesion of the blood. How far these degradations of the pure and acute inflammatory type depended on the nature of a special remote cause, on the seat of the principal inflammations, or on the agencies which, as we have seen, exerted a modifying influence, cannot perhaps be determined. I shall recognize the whole, without attempting to assign the value of either.

VI. Modes of Treatment.—These were various, and prosecuted with *American* energy, but none proved satisfactory. In the beginning the condition was often not unlike that of a patient in the paroxysm of a malignant intermittent. The object was to excite reaction. To that end external and internal stimulation was employed, but with little or no success. Others, as Dr. Ames, bled copiously without regard to the state of the pulse, but it did not rise, and no direct benefit resulted from the loss. These were called congestive cases, and generally proved fatal. When the arterial excitement was that of reaction, and the pulse not less than the headache and other symptoms seemed to demand bloodletting, the loss of thirty, forty, and even eighty ounces of blood in twenty-four hours, seemed to produce little effect, either good or bad. Dr. Boling, in the same epidemic, took from a girl only fifteen years of age, forty-eight ounces by cups, and twenty-six by the lancet in eighteen hours. In another case Dr. Ames drew forty-four ounces at a single bleeding, and although the pulse was enfeebled by it, and the face was made pale for several days, the excruciating headache "was hardly at all relieved." In another case, seeming urgently to demand it, the loss of blood was such as to produce a great tendency to syncope, which continued for some time, yet "no relief whatever was obtained from it." On the whole, however, Dr. Ames is of opinion, that

"prompt and free bleeding in the early stages" gained time for "other remedies more obviously beneficial to produce their effect." In vigorous constitutions Dr. Hicks at the onset of the attack sometimes found blood letting advantageous, yet it was generally unsuccessful. Dr. White tried but abandoned it. Dr. Gray never employed the lancet, but was told by others that it invariably proved injurious. Dr. Chester employed cupping but not bleeding. Dr. Love sometimes bled, but found no benefit from it. Dr. Fenner did not resort to the lancet, but found cupping useful. Dr. Scruggs both bled and cupped without a satisfactory result. Dr. Richardson did not bleed. This abstract shows that the greater number of those who saw this disease were deterred by the symptoms from bleeding; and that those who thought it admissible or demanded were disappointed in its effects. We are thus taught (not a new but) the important therapeutic truth, that there are combinations of inflammation and fever, over which the loss of blood exerts but little control. In this instance the failure harmonizes fully with the state of the circulation, as indicated by the symptoms. Yet in this and many other fevers a single bloodletting, although not curative, is, in certain cases, indirectly beneficial, by diminishing plethora or increasing the susceptibility of the system to medicine.

As the bowels were generally costive, cathartics seemed necessary. Dr. Ames employed them to a limited extent, and they were sometimes useful, but he saw two cases in which their drastic operation was injurious. Dr. Hicks gave a mercurial cathartic after venesection in the beginning of the disease with decided benefit, but does not seem to have repeated it. Dr. White found purging of little value. Dr. Gray purged but little. He saw convulsions and syncope follow on the operation of ten grains of calomel. On the whole I may say, that although the state of the bowels seemed to demand free purgation, so beneficial in sporadic cerebro-spinal meningitis, cathartics were administered so sparingly, that a fair trial of their power was scarcely made. This, perhaps, arose from observing no benefit from the first, or from the opinion prevalent throughout the South in latter years, that copious purging is unsafe in all its fevers. Should this disease prevail in higher latitudes, purging would probably be found both safe and beneficial. Emetics are mentioned as having been employed, but with no commendation.

Calomel, with Dr. Ames, was a favorite remedy. There was no tendency to diarrhœa, and the medicine never produced intestinal irritation; he frequently employed mercurial inunction at the same time. In a few instances an early salivation had no effect in arresting the disease; in others no constitutional effects were produced, either from want of time or of susceptibility to the action of the medicines. Still, they were regarded as more beneficial than bloodletting. Dr. White tried "mercurials" without any satisfactory results. Dr. Frenner gave large doses of calomel and camphor with good effect. In general the "mercurial practice" does not appear to

have been adopted to much extent, and the chief testimony as to its successful employment is that of Dr. Ames, which cannot be regarded as decisive.

Carbonate of potash was administered by the gentleman just named, in a number of cases, mostly not the malignant, with effects which give him much confidence in its power. He had previously given it with advantage in hydrocephalus. His dose in the epidemic was from ten to fifteen grains every two hours to adults, and from three to five grains to children, according to their ages. As he used "other remedies of the most energetic kind" at the same time, it is difficult to estimate the value of the alkali.

The antimonial preparations were but little employed, but Dr. Hicks speaks highly of the following mixture:—

R.—Pulverized Camphor, ... ℥j.
Tartarized Antimony, ... gr. ii.
Mucilage of Gum Arabic, ... ℥vj.
Triturate together, and give half an ounce every two hours.

The sulphate of quinine was employed to some extent by Dr. Ames, and condemned; but in the most remitting cases it occasionally did good. Dr. Hicks has said nothing of it, and Dr. White nothing in its favor. Dr. Chester found it fail, even when the fever was "regularly intermittent." Dr. Boling saw it succeed in two intermittent cases which were not very violent, while it failed in others of a graver character. In certain cases which seemed to demand it, Dr. Love found it injurious. Other physicians say nothing of it, or nothing to vary the conclusion that it was not adapted to the cure of this disease.

But little opium was used, and the reports concerning it are generally of a negative character, or, with a few exceptions, against it.

Cupping and blisters were extensively employed over the head and whole length of the spine; but no case is mentioned in which decided abatement of the pain or tetanic spasms followed their operation, except by Dr. Ames, who saw the headache greatly relieved by blisters when venesection had failed. He also saw sinapisms and oil of turpentine do good service in several cases.

Cold water to the head and spine is mentioned by some, but without any estimate of its value. The full effect of cold applications over the spine was not, I think, ascertained.

During convalescence, Dr. Hicks found the following formula beneficial in removing the "inertia of the nervous system:"—

R.—Iodine, ... gr. viii.
Iodide of Iron, ... ℈j.
Hydriodate of Potash, ... ℥ij.
Syrup of Sarsaparilla, ... ℥iv.
Mix, and give a teaspoonful every four hours in a little water.

The efficacy of every mode of treatment in this disease seems to have

been small. The ratio of its mortality cannot be calculated. At Mont gomery, Dr. Ames, estimated it at sixty per cent. of the malignant cases but the proportion of these to the whole number is not given. In som other localities, as on the Mississippi, among the troops, it was still greate In some country settlements, where the number of patients was compar tively few, nearly all died.

In conclusion, I may say a few words on the European treatment of thi malady; and a few will be sufficient, for it was substantially the sam which has been detailed, and the results were equally unsatisfactory. Th testimony in favor of opium and quinine, however, and especially of th former, is more favorable there than here, and both appear to have bee more extensively administered,—bloodletting having been premised.

CHAPTER X.

INFLAMMATIONS OF THE ORGANS OF MOTION AND OF SPECIAL SENSE—RHEUMATISM—OPHTHALMIA

SECTION I.

RHEUMATISM.

I. Relations with Myelitis.—We may pass from myelic or spinal inflammation to articular rheumatism over two facts which seem to connect them together; or, at least, to establish a relation between them. In October, 1844, a gentleman, twenty-seven years of age, who had never experienced an attack of rheumatism, fell from a considerable height on his back, upon a hard inelastic floor. The concussion was so great that it was with some difficulty he could walk from the gymnasium. During the following winter he experienced several attacks of thoracic stricture and dyspnœa, sometimes simulating globus hystericus, and, although he "kept about," his limbs were weak. In the following June, after standing on his feet most of the day, and lifting a number of articles, he was seized at night with severe pain in one of his legs, and found difficulty in leaving his chamber in the morning. Before the following night, he was compelled to lie down, from excruciating pain in both legs and one arm. Almost immediately it became concentrated in his ankles and feet and one wrist and hand, the whole of which swelled, reddened, stiffened, became exquisitely tender, and suffered intense pain,—displayed in fact all the symptoms of acute rheumatism, and confined him to the bed for three weeks. I cannot doubt that this articular inflammation was occasioned by the spinal concussion.

The other fact to which I referred is recorded by Dr. Gray and Dr. Love

in their respective histories of epidemic cerebro-spinal meningitis, both of whom saw pain, tenderness, and swelling of the joints of the extremities, which, like metastatic rheumatism, frequently change their place.

These facts, which increase the evidence, collected by modern observation of the spinal or myelic origin of articular rheumatism, will at least show that there is no nosological impropriety in introducing it immediately after inflammation of the cerebro-spinal axis. It would be waste of time to go into the symptomatology of this well-known disease, and I shall therefore consider it under other aspects.

II. Etiology.—1. A hasty generalization might declare all rheumatic inflammation of spinal or myelic origin, and thus make it a secondary affection; but such, I take it, is not the fact. Every physician has seen it limited to a single joint, and that, in many cases, one which has been sprained or bruised at some antecedent period. It is equally well known that severe attacks have continued for a long time without the least manifestation of spinal disease, unless, by a *petitio principii*, we declare the articular disease to be such a manifestation. Again, the tissues which are most affected in rheumatism are not most endowed with nerves. Lastly, there seems from the products of rheumatic inflammation to be a peculiar humero-solid diathesis, a condition of the blood, *sui generis*, and not a mere lesion of spinal innervation. We may conclude, then, that spinal or myelic inflammatory irritation is but one of the causes of rheumatism.

2. There is no doubt, I think, that some families are more subject to rheumatism than others living under the same circumstances, that, like gout, it is, in fact, to a certain moderate degree, hereditary. The child is born with a predisposition, and slight exciting causes bring on the inflammation. It may be said that this predisposition involves the spinal cord, and I cannot prove that it does not. At this moment, however, we are but contemplating the historical fact of a transmitted liability to the disease.

3. Childhood and youth predispose to rheumatism. What are called "growing pains," for which our children get so little sympathy, are morbid sensibilities and achings of the periosteum of the long bones, and occur in the legs more than the arms, from their being more violently exercised. Such affections are but tendencies to rheumatic inflammation. The attacks of the disease are often transient in childhood, and are soon forgotten; but I have so often found by retrospective inquiry that the man affected with rheumatism, or a lesion of the valves of the heart, had experienced one or more attacks in boyhood, that I cannot doubt the great liability of that period to the disease. At whatever age it may first occur, its recurrence is to be expected. Every attack, indeed, seems to prepare the way for another under exciting causes of a still slighter character.

4. The male sex is more subject to rheumatism than the female; but this may not be constitutional, for men are more exposed to certain well-known or reputed causes than women.

5. Rheumatism, like gout, may be produced by a full diet with stim
lating drinks. Some of the most violent and obstinate cases I have e
seen were in gormandizers, especially when they drank whiskey at the sa
time. It is certainly remarkable that gout should be so rare in this co
try, the population of which has been so largely derived from England.
have seen many cases of what might be called rheumatic gout, but in fi
years have not seen five cases of gout answering to the description of t
malady as given by Sydenham, a fact the more remarkable as the people
England two centuries ago lived on a comparatively simple diet, with ha
of life and pursuits not very different from those of our Interior Vall
According to the great observer just quoted, those most liable to gout w
men of a "plethoric, moist, and lax habit of body, and withal of a stu
and vigorous constitution, and possessed of the best *stamina vitæ*."* T
I think, is a comprehensive account of the true English temperament; l
immigration to this country has modified it, and diminished the liability
that disease. There may be another reason still. Gout is not only
disease of "high livers," but of men who at the same time are of cultiv
intellect, and pass their time in study, leisure, or sensual enjoyment. M
this class is very small, even at the middle of the nineteenth century, in wh
as compared with Europe, may be called, as heretofore, the Backwoods.

6. Over exertion of the back and limbs, contusions of the joints a
sprains, are causes generally predisposing, sometimes exciting, of rheum
tism. This is one of the reasons why the disease prevails so much in t
country, and among the laborious classes of our river men. The stretch
or bruised fibrous structures of the joints very slowly recover their norm
condition, and often remain permanently weakened, and susceptible of i
inflammation. Blows on the back, moreover, and heavy liftings, are preju
dicial to the muscles and their fasciæ, the ligamentous, and cartilaginou
tissues of the spine, and the medullary cord itself; whereby lumbago, sci
tica, and secondary articular rheumatism are, so to speak, incubated, if no
(without the aid of other causes) brought forth.

7. The relations between rheumatism and climate have at all times bee
admitted. Mere vicissitudes of temperature may produce it; but change
in the humidity of the atmosphere, especially its saturation with moistur
when the thermometer stands low, are still more injurious. The approach
of rain or snow often brings on an attack. Exposure to falling rain, or to
the night air without sufficient protection of the surface of the body, is
equally prejudicial. Even in our hottest latitudes this influence is ope
rative, and hence rheumatism is as common among the seamen of the Gulf
of Mexico, and the soldiers garrisoned on its coasts, as among the watermen
and troops of the Great Lakes fifteen or twenty degrees further north. To
these climatic influences we may chiefly ascribe its prevalence among the
negroes of the South and the Indians of the West. The agency of climate

* Wallis's Sydenham, vol. II. p. 188, London, 1788.

in the production of the first attacks is not always recognized, but when the disease has assumed a chronic and relapsing form, the joints which have often suffered frequently give premonition of atmospheric changes in advance of our hygrometers and barometers; a fact which suggests that the system of a rheumatic may be affected in an occult manner by the electricity of the air.

8. The relation between rheumatism and autumnal fever, or its cause, must not be overlooked. The localities which breed the latter are generally infested with the former; but the moisture which is necessary to the production of the *cause* of that fever may be the direct cause of the rheumatism. Yet, admitting this, enough of pathological relation remains to fix our attention. The rheumatism which prevails in what is called malarial situations is less acute than in other localities, and more apt to be complicated with gastric and especially biliary derangements. But what is still more to the point, its subacute, chronic, and relapsing forms are apt to assume more or less of an intermittent type, and demand a treatment similar to that for protracted intermittents. And this reveals to us a pathological relation between rheumatism and certain neuralgias.* There is not in fact any line of distinctive diagnosis between them. They are seated apparently in the same tissues, the pain is of the same kind, in many cases they are respectively productive of simple, temporary hyperæmia, and they are relievable by the same treatment. Rheumatism then becomes a neurosis.

9. I must not omit a passing (though not very satisfactory) notice of another combination which may be as well introduced here as elsewhere. Since the year 1849, for the last two years, there has prevailed in Cincinnati and other places in the Interior Valley, a sub-epidemic phlegmonous inflammation, in the form of paronychia, furunculus, and carbuncle. In less than a year I saw in consultation three fatal cases of the last, a greater number than I had ever seen in our city before, and the first two were common and obstinate beyond all precedent. They were, I think, more common among the male than the female sex, but of the victims of carbuncle, two were women advanced in life. When this malignant phlegmonous atmospheric constitution was upon us (which is even down to the present time), cases of erysipelas were so common as to indicate an equal tendency to that disease. Thus, while a young man was fatally ill of that disease, his blood cousin of the same age was suffering under a series of most painful paronychiæ, the last of which was immediately succeeded (without any obvious cause) by an attack of violent acute rheumatism in the left hip and right hand, and his father, who had been physician to his cousin, was meanwhile seized with erysipelas. I would not generalize from a single case, yet it does seem as though the rheumatism was connected in origin with that occult constitution of the atmosphere which gave birth to the paronychiæ,

* See Book ii. Part i. Ch. x. Sect. vii.

carbuncle, and phlegmonous erysipelas; to which I may add, that about or soon before the same period, suppurative inflammation of the cerebro-spinal membranes was, as we saw in the last chapter, prevalent in various parts of the Valley, and attended, in several persons, with rheumatic pain and swelling of the joints.

10. Gonorrhœa sometimes becomes a (pathological) cause of rheumatism. This complication must be rare, however, for I have met with but one well-marked case. The late Professor Richardson, of Transylvania University, informed me that he had seen several, and they all like my own proved uncommonly obstinate. It commenced while the patient was still laboring under the first disease; attacked the larger joints, with the usual phenomena, and changed from one to another. I cannot concur in the opinion that it is most frequent in those who are treated with balsam copaivæ, having seen a great number of patients take that medicine without supervening rheumatism; nor do I suppose that it depends on stricture, which was certainly not present in the case to which I have referred. It occurs, I presume, in those who have a rheumatic diathesis, on which the gonorrhœa merely acts as an exciting cause.

III. Pathology.—We are scarcely at liberty to regard rheumatism as one of the simple phlegmasiæ, consisting in an antecedent inflammation of a joint and a consequent fever, such as might result from mere external violence, for in many cases the fever precedes the inflammation; the hyperinosis of the blood is out of all proportion great, compared with the extent of the inflammation, the excretions from the skin and lungs are frequently sour and offensive; deposits of a peculiar kind are made in the inflamed part; the inflammation frequently changes its place, or appears in several at the same time; lastly, the antiphlogistic treatment exercises less control over it than over that which follows mechanical injury. All this indicates a *quasi* peculiar, phlogistic diathesis. To what extent or in what manner the innervation is affected in this condition of the system, I do not pretend to understand. The general integrity of the intellectual functions suggests that the brain is not involved, but we may perhaps admit that the spinal cord and the excito-motory nerves are in many cases implicated; that this may be one cause of the metastasis so characteristic of this disease, and of the rigid muscular contractions, which so often lead to permanent infirmity, not to be accounted for, in many cases, by the tophaceous deposits around the joints.

As to the state of the blood we perhaps know but four facts: *first*, the decided increase of fibrine beyond what takes place in most phlegmasiæ. *Second*, the diminution of corpuscles, greater I think than can be accounted for by the loss of blood. Hence the prominence and cupping of the buffy coat, and the comparative smallness of the clot; phenomena which I recollect to have noticed long since, and the reality of which has been lately established by experimental hematologists. In the opinion of Simon, the red

corpuscles are the source of uric acid, the fatty acids, including the choleric of the bile, and the lactic acid of the sweat. If this be true, we may understand why in rheumatism, when a part or the whole of these acids (normal elements of the blood), are augmented, there may be abnormal diminution of the corpuscles. *Third*, as a negative character, a reduced tendency, as compared with many of the phlegmasiæ, to the production of pus. I am aware that the variety of suppuration in this disease is generally ascribed to the inflammation being seated in the fibrous, ligamentous, and synovial tissues, but in every case it also extends to the surrounding and connecting areolar texture, and yet suppuration but seldom occurs. *Fourth*, an acid development in the blood.

When acute rheumatism abates under a copious perspiration, the secreted fluid is often, if not always, acid beyond the normal degree, and the odor gives in many cases evidence of the presence of acetic acid. We can scarcely suppose this to be formed in the skin, through which it is but eliminated, especially when we recollect that the same phenomenon often attends the conclusion of a fit of dyspepsia. If not developed in the blood, it passes through that fluid to the cutaneous and pulmonary emunctories. But the quantity of lactic acid, a normal element of the blood and sweat, is according to Simon usually increased in the perspiration in cases of rheumatism,* showing that it must be augmented in the blood. It has been lately affirmed by Dr. Garrod,† that in acute rheumatism, there is no increase of uric acid, another normal ingredient of the blood, but this merely negative testimony is opposed by the positive results of the experiments of Dr. Maclagan,‡ who in several cases, detected a great increase of that acid in the blood and a diminution in the urine. Thus the attempt to establish, on the presence or absence of this acid, a distinctive diagnosis between gout and rheumatism, was premature. It must be admitted, however, that the uric acid diathesis is far more evident in gout than in rheumatism, and hence the great frequency of tophaceous deposits of urate of soda in the one, and their variety and limited volume in the other disease. It may be perhaps that while the gouty diathesis is characterized by uric acidity, the rheumatic is marked by the lactic and acetic, without exclusiveness in either. However, other acids, or their bases, exist in healthy blood, and being increased in quantity, may contribute to the rheumatic if not to the gouty diathesis; these are, the fatty, as the oleic, margaric, and stearic. In one case of acute rheumatism, Simon found the fat of the blood "sensibly increased." The relations of all these acids to each other, and to the other elements of the blood, is too obscure and subtile to be dwelt upon by the mere physician, who may admit, however, that in the metamorphosis of the first formed elements, unknown disturbing influences may diminish the production of one acid and increase that of another, whereby the acidulous diathesis may

* Chem. of Man, p. 377—Phila. Ed. † Brathwaite's Retrosp., vol. xxi. p. 338.
‡ Ibid. vol. xxv. p. 38.

in many cases, in abuses of diet, and disordered states of the chylopoietic functions; but, in others, they may arise from disturbance of assimilation. The former occur in the chyle and venous blood, the latter in the arterial blood, the various tissues, and the organs of sanguineous excretion. To these disturbances of chylification and assimilation, disordered states of the innervation may contribute, and hence a rheumatic diathesis includes lesions of both the solids and fluids.

IV. Anatomical Lesions.—Partial or perfect immobility of the joints may follow on rheumatism. For awhile after the inflammation has ceased, there may be great stiffness of the joint, with limited motion. It is common to regard this as resulting from an undefined lesion of the articulating ligaments, but I would refer it in part to an extension of the inflammation to the muscles which are left with a disposition to continued and permanent contraction. In many of these cases there is, I presume, a deposition of lymph in the intermuscular substance, which, by its spontaneous contraction, contributes to the rigidity and shortening of the muscles. They seem in fact to undergo an organic change. In gout, the stiffness or immobility is commonly the consequence of the deposition of urate of soda, but it must be admitted that in rheumatism this seldom takes place. When the inflammation attacks the synovial membrane of an enarthrodial joint, as that of the hip, the filling up of the socket by effused fluids may occasion spontaneous dislocation; and when it attacks the articulating or cartilaginous surfaces, adhesion and permanent anchylosis may be the result. When the inflammation attacks the sclerotic coat of the eye (rheumatic ophthalmia), if the cornea should be involved, as sometimes happens, ulcerative inflammation may discharge the humors of the eye; but more frequently the inflammation extends to the choroid and retina, giving rise to amaurosis, with tuberous deformity of the eyeball.

The most serious lesions from rheumatism are found in the heart, especially in the valves of the left side, which, becoming loaded with fibrine, move with difficulty, and generate a rasping or purring sound. From this impediment to the circulation, result hypertrophies, and ultimately death itself. I have seldom heard this sound in a young person (not chlorotic) without learning on inquiry that articular rheumatism had previously existed. In this country, these lesions are far commoner than those of the eye, and often remain undetected for a long time.

It is not necessary that the inflammation should be of the acutest kind to produce permanent infirmity. On the contrary, we frequently meet with ingravescent articular rigidity in cases of subacute or chronic rheumatism. The extent to which permanent rigidity and apparent anchylosis may take place, is illustrated by the following case, which, through the politeness of Dr. Rosa, of Painesville, on the shores of Lake Erie, I had an opportunity of examining in the year 1842. The history of the case was taken down from the recollection of the patient, his mother, and Dr. Rosa, who had been his

present much chemical var… …mination was made by myself, and by the vital properties and … The acetic, lactic, and … years, was born in Ontario County, gen, in varying propo… …urhood of Painesville when seven years ment, nitrogen. Nov… …ears of age, having previously enjoyed outlet of the nitr… …active boy, he was, without any known to excrete lactic, … slight pain in his left knee. He was still ral emunctories … in the winter was worse; but next spring may hypothe… …was able to work. In the following winter matism, of t… …require him to lie by. In the spring after cases whilst … pain and swelling in his right knee. About this we know … and relaxed that it seemed as though it would from th… …rwards it began to "draw up," and in the fol- a short … winter, it became flexed nearly at right angles mo… …knee went through precisely the same course, flo… …the left, and was at length anchylosed. The right …, and experienced the same fate; then the left elbow; … side. All suffered pain and swelling, followed by … looseness, succeeded by anchylosis. The elbow is … rotated into pronation, or towards the thumb, where …ble. While these derangements were in progress, the … attacked his neck. The pain and swelling were mode- …n became so great that he could not hold up his head. …llowed, with his face inclined forwards, downwards, and … where it remains permanent. After this, the left ankle, … became the seat of the same series of morbid changes, …ly anchylosed. Subsequently his whole spine stiffened, with …vature; his ribs became immovable; his jaws became fixed, … all his articulations, the following only retain a capacity for …ited extent:—the shoulders admitting a little rotation of the … and the fore and middle finger of his right hand. Eight … ten after the first attack, his left, and the next year his …me inflamed. They were red, and discharged hot water. In … blindness ensued. At this time the balls are sunken, reduced … irregular in shape. The cornea of each retains its transparency, … in contact with the iris, the pupil is much contracted and … with false membrane. On the top of his head, there is a broad … the scalp over it is verrucous or covered with white warts. …d pain in these parts before these anatomical changes occurred. … are red, soft, and atrophied. All his nails have suppurated … off, except that of the left thumb and right little finger, and in … have shot out horny, rough spurs, or conoidal excrescences, at … from the places covered by the nails. His toe-nails remain.

His muscles, except those of his face, and the trunk of his body, are greatly atrophied, and feel soft. His face, allowing for the loss of eyes, looks pretty well—has indeed a tolerably healthy and intelligent expression. His appetite is good. He generally has two alvine evacuations in twenty-four hours. His urinary discharges are regular. His pulse is firm and regular—108 in a minute.

As his ribs are immovable, inspiration is effected by the depression of his diaphragm. For the last two years, the pain which he experiences is mostly in his head, but shifts and wanders. His appearance was cleanly—mother a poor widow—cheerful.

V. Constitutional Treatment of Acute Rheumatism.—1. The period of life in which this disease generally occurs, the constitutions of those most subject to it, the fever, the force and frequency of the pulse, the known hyperinosis of the blood, and the acute pain in the affected part, unite in suggesting an active antiphlogistic treatment. In common with others, I have been accustomed to employ it, and cannot believe that it should be omitted; yet I have rarely seen the disease cease under its influence. In early life, under the teachings of that earnest and eloquent advocate of liberal venesection, Dr. Rush, I bled many patients, till the crassamentum of the blood was strikingly reduced; but the disease continued, and the buffy coat, in part, no doubt, from the loss of the red corpuscles, seemed as thick on the first as the last clot. Nevertheless, I am far from believing that bloodletting is not necessary in such cases, for while the vessels are full, and the power of the heart great, the system is not susceptible to the impress of therapeutic agents. I have seldom resorted to local bleeding, because inflamed joints are generally too tender to bear cups, and leeches in this country have always been too scarce.

2. Emetico-cathartics, preceded by venesection, are frequently of more immediate benefit than the loss of blood. They are especially required in patients who are given to gormandizing. In all such, a thorough evacuation of the stomach and bowels is generally followed with mitigation of fever, swelling, and pain. The dose may be repeated with advantage, and the purging as a means of depletion and revulsion, kept up for some time. It cannot be doubted, I think, that vomiting carries a beneficial influence into the whole nervous system, while it promotes a determination to the skin, than which nothing is more beneficial in this disease. Many cases of rheumatism, in autumn and winter, occur in persons whose biliary systems had been deranged in the previous summer, and free vomiting is the more beneficial on that account. Antimonial emetics are the best; and no compound is superior to Rush's powder, composed of a sixth of a grain of tartarized antimony, a grain of calomel, and ten grains of nitre, which will both vomit and purge. Another appropriate formula is calomel and jalap with tartar emetic. Another, calomel followed with compound powder of jalap; or jalap and nitre. The last-named salt has recently been advised in large

blood by increasing the secretion of urine. In cases attended with that diathesis, it no doubt does good in that way; but it also acts beneficially on the nervous system and the heart. Yet, if I am not mistaken, its influence over rheumatism is much less than over gout. I have certainly seen rheumatic fever and inflammation survive the obvious and powerful impress of that medicine on the body. The best mode of giving it is in doses of two or three or four drachms of the wine with forty or fifty drops of laudanum, at bedtime. Thus administered, it often increases secretion into the bowels during the night and excretion from them the next morning, when it generally does much good. Instead of this potion, I have used the formula of Dr. Scudamore,* but have not seen it as beneficial in rheumatism as that physician found it in gout.

6. I have referred with approbation to the nitrate of potash in speaking of Dover's powder; but must say that this refrigerant diuretic has, uncombined with other medicines, been liberally administered in acute rheumatism, not only with safety, but decided advantage to the patient. Dr. Bennet† has seen it given in a great number of cases, from six to sixteen drachms in the twenty-four hours, without the least gastric or renal irritation. It must however, be largely diluted to render it safe,—a mode of administration well fitted, moreover, to increase its efficacy. Its effects are a lowering of the force and frequency of the pulse, with increase of secretion by the kidneys, bowels, and skin. Thus, it fulfils the therapeutic demands of this case, by subduing or lessening inflammatory orgasm and depurating the blood. The tolerance, by the system, of these extraordinary quantities, reminds one of its tolerance of tartar emetic in pneumonia, and of opium in delirium tremens, and seems to show that it is well adapted to an acute rheumatic diathesis. I have not given it in the doses mentioned, but am disposed to regard the practice as worthy of trial.

7. Dr. Buckler of Baltimore,‡ on the theory of urate of soda and lime in the blood, has proposed the administration of phosphate of ammonia, to effect a double decomposition, the results of which would be phosphate of soda and urate of ammonia, both soluble salts, which would pass off with the urine.

8. Potash, or its carbonate, indifferently, has been strongly recommended by Dr. Furnivale,§ on the theory of an acid constitution of the blood. He does not affirm that it will subdue, but has seen it moderate the disease; his great object, however, is to prevent inflammation of the endocardium and valves of the heart, which, he assumes, is chiefly occasioned by the state of the blood. He believes, moreover, that it keeps the fibrine in solution, and thus saves the valves from the sinister effect of its deposit upon them. I

* ℞.—Magnesia, or its carbonate, from . . . . . gr xv. to gr. xx.
Sulphate of Magnesia, from . . . . . ℥j. to ℥ij.
Acetous Tincture of Colchicum, from . . . . . ℥j. to ℥ij.
Mix, and dilute with any kind of aromatic water, as infusion of peppermint. This dose to be repeated every two, four, or six hours.

† London Lancet, Feb. 1844. ‡ Amer. Jour. Med. Sci. § Ibid. June, 1844.

have used it in a single case only. It did not seem to arrest the inflammation of the joints, but the patient recovered without a metastasis to the heart. He advises that it should be given in moderate quantities in connection with colchicum. Dr. Wright,* also testifies, after an experience of six years, to the efficacy of this practice. He has used the carbonates of both potash and soda, preferring the former only when uric acid prevailed in the urine, as forming a soluble salt. He gives from eight to ten grains every two or three hours, in the camphor mixture of the shops, and at the same time directs warm bathing, general or topical, with a solution of the same alkali.

9. It is rather perplexing, at least to the sciolist in chemistry, to find the very opposite treatment still more strongly commended. Dr. Atkinson tells us that he has used common vinegar with success, but prefers the distilled. His formula is below.† He does not propose this for young subjects; but for men of broken down constitutions affected with gastric derangements.

Much greater stress has, however been laid on fresh lemon juice, composed of citric acid, or supercitrate of potash, malic acid, gum, and bitter extractive, dissolved in water. Dr. Rees, of London, first directed the attention of the profession to this remedy in 1849, since which several physicians have reported in its favor, of whom its greatest advocate is Dr. Babington.‡ In his practice it did not increase the discharge of urine, but to some extent that of perspiration. Its most obvious and constant effect was a diminution in the force and frequency of the pulse, with a simultaneous abatement of febrile heat, swelling and pain.

In six or eight cases, the average time of a perfect cure was little more than a week, the patients generally finding great relief within half that period. The dose was from four to six ounces, three times a day. When it did not keep the bowels open, a little rhubarb was administered. While Dr. Babington was making these trials in London, Dr. Pepper was engaged on the same subject in Philadelphia.§ His dose was but half an ounce four times a day, yet the results of the administration were not materially different from those of Dr. Babington. They are reported in fourteen cases, several of which, however, were unattended with fever. It was injurious in none, more or less beneficial in all but one, and promptly curative in the majority. The urine of most of the patients was examined and found either less acid or neutral. In none was it increased in quantity. In all the cases of Dr. Babington, and nearly all of Dr. Pepper, it was employed without previous bleeding or other preparatory treatment.

A word on the *modus operandi* of lemon acid. The chemical therapeu-

* London Med. Times for June, 1847.

† ℞—Acetic Acid, ... ℥j.
Tincture of Jalap, ... min. xx.
Tincture of Orange Peel, ... ℥j.
Camphor mixture sufficient to make a draught, to be taken three times a day.

‡ London Lancet, November 1851. § Trans. Col. Phys., New Series, Vol. i. p. 124.

tists have argued that lemon juice produces its effects by conveying into the blood a minute quantity of potash to act as a neutralizer. Lemon juice, it is said, contains a supercitrate of that alkali; which is converted into carbonate, when the acid by digestive assimilation is metamorphosed into water and carbonic acid. The carbonate of potash thus formed, is supposed to be decomposed by the uric acid of the blood, and the urate of potash discharged off by the kidneys. But Prout has ascertained, that lemon juice contains less than two parts in a hundred, of both citric acid and potash, and, therefore, we are not at liberty to believe, that an acid blood can be rendered neutral, by the doses of lemon juice which Dr. Pepper found efficacious. Dr. Keating, moreover, has seen crystallized citric acid, destitute of potash, equally efficacious with lemon juice in the treatment of rheumatism.* Thus, we are required, in the present state of our knowledge, to ascribe the beneficial effects of this acid to its action on the vital properties of the solids by which their phlogistic tone is reduced, and at the same time the peculiar rheumatic action is set aside. In other words, it appears to be an antiphlogistic alterant.

VI. Topical Remedies.—I shall not dwell on the local treatment in acute rheumatism, from a conviction that until the constitutional dyscrasia is subdued or at least much abated, topical remedies are of little avail. When leeches can be obtained, they may be applied in numbers proportionate to the extent of the inflammation, after the momentum of the circulation has been weakened by venesection, and are well adapted to cases which do not seem to permit the lancet. When the inflammation is seated in the sclerotic coat of the eye, they may be used with great advantage. When the inflammation of the joint is deep-seated and the skin is not too tender for cupping, that may do more good, as more revulsive than leeching.

Of applications to the affected part, water is one of the best. When the fever is decidedly inflammatory and the heat intense, it may be cold. Under other circumstances, and especially when the system is irritable, it should be warm. In the latter condition, the joint should be coated with lint dipped in tepid water, and covered with oil or varnished silk, to restrain evaporation. According to Dr. Wright, already quoted, its efficacy is greatly increased by the addition of carbonate of soda; and the nitrate of potash has also been found beneficial. The effect of chloroform confined by impervious dressings remains to be ascertained. As to blisters, as long as the inflammation manifests a metastatic character, they had better be withheld. I have seen the disease leave the knee and fall on the hip-joint before the plaster had been removed. But on this very account, when the disease attacks the heart, a larger blister should be immediately applied to the precordial region. The general excitement being reduced and the inflammation fixed, a blister often does much good, especially if the patient be quieted during its operation by a large dose of laudanum or solid opium.

* Trans. Col. Phys. New Series, Vol. i. p. 142.

obtained in a few days. Of *formulæ* the best is the antimonial and calomel-nitrous powder of Dr. Rush, which, in the midst of adequate evacuation will generally excite a slight mercurial alterant action. Under this treatment many cases of primary subacute rheumatism are speedily subdued, but it often fails; and then the case assuming a chronic character must be met by the same remedies as that which was originally intense.

We have thus before us all cases of chronic febrile rheumatism; and although febrile they are no longer to be met by depletion; but are they, therefore, to be treated with stimulants and tonics? It may be replied, that in proportion as the previous depletion has been copious and rapid, the medicine we administer may partake of that character, and in proportion as the fever is low, so that little but non-febrile neuralgia of the joints remains, stimulation is admissible.

Some cases of this kind yield to a course of Dover's powder and calomel at night, continued till the mouth is slightly affected. Others give way to a fourth, sixth or eighth of a grain of tartar emetic, every two hours, with opium or laudanum at bedtime. The wine of colchicum, in small, repeated doses, with some preparation of opium at night, sometimes succeeds. Lemon juice, although better adapted to cases of high phlogistic action, has now and then been successful. It is to this grade of the disease that the hydriodate of potash is most appropriate. In the year 1843, I visited the hospital of the late Dr. Luzenberg, New Orleans, and found him exhibiting this medicine, in drachm doses, several times a day, to a number of rheumatics, and he assured me that its curative effects were most manifest. In my own practice, however, they have not been so obvious. It seems probable that many of his cases were of gonorrhœal or syphilitic origin. Bark, and the sulphate of quinine, must not be overlooked. Their best effects are obtained immediately after bloodletting, when the vessels have been suddenly unloaded and the excitement as rapidly lowered. Their chief adaptation, however, is to cases occurring in so-called malarial localities. This remark is equally applicable to arsenious acid, which, administered in connection with opium, sometimes proves beneficial. The latter medicine should indeed be given at night, whatever else may be in use. It has even been proposed to cure the disease by solid opium only. I have given it as high as six grains in the twenty-four hours, but, although it gave much relief, I have not seen it entirely successful. It has been proposed to substitute other narcotics, as hyoscyamus and stramonium, for opium, but they are less efficacious; though when the constipating effects of opium embarrass the treatment, they may be substituted for it. Flowers of sulphur, in small drops with laudanum, at night, to restrain its action on the bowels, and determine it to the skin, has sometimes succeeded. Relief, and sometimes a perfect cure, has also come from the internal use of the salino-sulphurous waters, so common in the Interior Valley. When their action on the bowels is restrained by

as exercise the hands and arms, will be proper. In all cases, the affected parts and the general surface, should be carefully protected from cold.

Many of the subjects of chronic rheumatism are great eaters. In one case, unable to control the indulgence of appetite, I attempted to moderate it by the administration of large doses of tartar emetic with opium, but did not succeed. I have no doubt that in many instances the disease is prolonged, and even rendered ultimately fatal, by this excess.

VIII. RETROSPECTION.—I regret that, in writing, both for and from information furnished by the physicians of our Interior Valley, I have not been able to present more that is new and reliable on the treatment of rheumatism. It may, I think, be seriously doubted whether within the present century, any important advance has been made, either in Europe or America, in the pathology and cure of this common, and often obstinate malady. As to the former, it is substantially the same with that of Sydenham, A.D. 1675, an inflammatory diathesis and a peccant matter in the blood, both taking the direction of the larger joints, and the latter requiring expulsion from the system. A *fuller* acquaintance with the signs, frequency, lesions, and sequelæ of rheumatism of the heart, and a *better* knowledge of the peccant materials of the blood, the qualities of the urine, and the chemical composition of the tophaceous deposits of the joints, constitute the achievements of the last half century, or even a much longer period.

As to remedies, it requires but a most limited retrospective research to learn that, with the exception of the newly discovered preparations of iodine and the vegetable alkalies, there is not one to which, at this time, we attach importance, that was not proposed fifty, a hundred, or a hundred and fifty years ago. Thus, Sydenham, who employed bloodletting, distinctly recognized that it may be carried too far, and that it must often be discontinued long before the disease is removed. After bleeding, he employed purgatives, and gave opium at night to "check the tumultuary motion of the blood," and we now do the same thing. Tartar emetic, and tartar, calomel and opium combined, recommended sixty or eighty years ago, are now among our standard remedies.

In the first half of the last century, colchicum, as appears from Quincy's Dispensatory, was a recognized remedy in gout and arthritic complaints, having the power of preventing the "lodgment of gritty matters in the joints," and dignified with the title, *anima articulorum*. The therapeutic transition from gout to rheumatism was almost inevitable, and before the end of that century, colchicum was employed in the latter disease.

More than a hundred years ago, bark was recommended by Swan, and afterwards by Fothergill, in this disease; and nearly seventy years since its intermittent type in certain cases was described by Trotter.

Guaiac has been in use quite as long, for even Buchan, ninety years ago, directed a drachm of this medicine mixed with a drachm of cream of tartar

mingled with the sero-purulent secretion. This, which is a true ophthalmitis, is not very common, and as far as I have seen, requires external violence for its production. In early times, when over the middle portions of our Interior Valley, the quarrels of men (now resulting in the use of the bowie knife and revolving pistol), were settled by the natural method of combat with unarmed hands, gouging was a general custom, and where life is taken now, an eye was lost then. Thus it is, that the manners of a people modify their diseases, which are never precisely the same in two successive ages. The favorite popular remedy for an eye which had suffered the compound violence of concussion, compression, and laceration, was the immediate application of fresh meat, as a piece of recently killed beef, but the common resource was a chicken "cut in two," and applied while the flesh was still quivering. As no inflammation had yet been set up, its effects, which I am not disposed to think highly of, were preventive. When a severe inflammation was not thus warded off, the eye was frequently destroyed. Inflammation once established in cases of this kind, the most active antiphlogistic treatment was required. But we must direct our attention to the inflammations limited to or at least commencing in single tissues of that multiplex organ, beginning, for the sake of a natural transition from the subject of the last section, with that seated in the sclerotic coat.

II. Sclerotitis.—Primary sclerotic inflammation in this country is comparatively rare, and very generally of rheumatic origin. It is both acute and chronic, but a large proportion of all the cases I have seen were of the latter class. The characteristic symptoms are pain and aching, not external heat and smarting, referred to the globe and orbit of the eye, often compared to that of rheumatism in the joints, and like it generally worse at night and in foul weather. As long as the inflammation does not extend to the iris or retina, the intolerance of light, though considerable, is much less than in those complications or in strumous ophthalmia. The external discharge is lachrymal rather than mucous. The vessels of the conjunctiva are but little engorged, and therefore the vascular condition of the sclerotic coat can be observed. It is one of congestion, but in a circle near the cornea the white is generally undimmed. Exterior to this, vessels display a light red and bluish tint. As in all cases of intolerance of light, the pupil contracts, which might suggest iritis when it does not really exist; yet as it often supervenes, the physician should be on his guard that he does not permit the contraction to become permanent. As a further diagnostic aid we generally find the patient to have immediately or remotely suffered from articular rheumatism, or a previous attack of sclerotitis. In some cases it extends to the cornea, which it renders turbid. When this affection goes on to the destruction of the vision, it is not always by obliterating the pupil, but oftener by extending to the choroid and retina, destroying the sensibility of the latter, and dissolving the vitreous humor. In old cases of this kind, the vessels of the sclerotica suffer varicose enlargement, the membrane

before the contraction is completed. It generally then loses its circular figure. In some cases the pupillary margin of the iris is agglutinated to the lens; but in others after the pupil has become closed by contraction or with effused coagulated lymph, it bulges forward towards the cornea from exudations behind. Now and then extravasations of blood from the distended vessels take place into the anterior chamber. When the inflammation is mild, extensive disorganization may occur, with but little constitutional disturbance; but the acute forms are often accompanied with severe inflammatory fever; and the forfeit of delayed or feeble treatment, may be irremediable blindness, or submission to an operation for artificial pupil, often difficult or unavailing, from the extension of the inflammation to the cornea and its consequent opacity. As the inflammation may extend to the retina, vision may be lost in another way by the disorganization and insensibility of that organ.

Simple acute iritis is a serious inflammation, demanding an active antiphlogistic treatment. But the effect of bloodletting is not always proportionate to the quantity drawn, for the eye is, anatomically, so loosely connected with the organism, that it does not readily feel the loss of blood by venesection, but at the same time is acted upon perhaps the more favorably by cupping and leeching. General bloodletting, however, when it may not immediately diminish the hyperæmia of the iris, prepares the way for and increases the efficacy of other measures. Among these at the beginning copious purging, as making revulsion from the head, is indispensable, and yet mere depletion of the bloodvessels and the bowels should not be our sole, nor in many cases, our greatest reliance. An antiphlogistic alterant is necessary, and no other can be compared with calomel. Its power over acute hepatitis is not greater than over iritis, and it should be administered in dangerous cases to the extent of two or three scruples in the twenty-four hours, till the inflammation yield or a salivation is induced. If it should excite the bowels beyond the effect of an aperient, opium should be combined with it, the exhibition of which will be safe, and its effects salutary as an antiphlogistic in proportion to the previous bleeding, and the degree of constitutional irritability that may have been awakened. In cases of a less acute character, local bleeding may suffice, and the calomel should be administered in smaller doses, as it must be continued for a much longer time. When the constitution was previously impaired opium is a valuable adjuvant. An acute inflammation may seem to be cured, and yet linger in the affected tissue till irreparable mischief is done, or it may from the beginning be so mild, as to excite no alarm till slowly induced lesions make their appearance; in all such cases a mild mercurial course is the chief reliance, though in such grades a blister to the temple, or over the entire orbit of the eye, the lids being closed, is an important auxiliary. The inflammation being finally arrested, its consequences when such exist are to be removed. These consist in the depositions of lymph as yet unorganized, and

CHAPTER XI.

PHLEGMASIÆ OF THE RESPIRATORY ORGANS.—ETIOLOGY.

INTRODUCTION.

THE phlegmasiæ of the respiratory organs, including the tubercular with the simple, are, beyond all doubt, more common and fatal than those of any other group of organs, indeed of all others taken together. I may even go further, and express the belief that, should accurate statistical tables be ever formed for our whole Valley, they will show that these respiratory affections afford a greater outlet of human life than any other natural family of our diseases, not even excepting our much-dreaded periodical or autumnal fevers. If this be so, they well deserve to fix our attention.

Still pursuing the method of analysis, I shall first present what in a manner is common to the whole. This, however, can be extended no further than their causes, after which the group itself must be analyzed by taking up the different species in succession. Having discussed the *modus operandi* of causes of inflammation, and a phlogistic diathesis, our task now and hereafter will be limited to an historical view of the relation between different phlegmasiæ and the agents or influences which seem to produce them.

SECTION I.

CLIMATIC, GEOGRAPHICAL, AND HYDROGRAPHICAL CAUSES.

I. THE connection between climate and pulmonary disease* is an established fact. Other diseases have their climatic relations; but, in general, they are indirect, or mixed up with various causes. Thus, without water and dead organic matter, warm climates do not produce yellow and periodical fevers; without filth and poverty and confined lodgings, the colder do not generate continued fevers. In the production of pulmonary phlegmasiæ, climate is no longer an agent quickening others into life, or a required con-

* I use, for convenience, the word pulmonary, as synonymous with respiratory—that is, as including the trachea, larynx, and nares—indeed, the whole apparatus of respiration.

III. The groups which I have formed are the five following: 1st. Upper Lake posts; 2d. Lower Lake posts; 3d. Northern Inland posts; 4th. Southern Inland posts; 5th. Gulf posts. By a reference to the article on climate, it will be seen that these groups represent real climatic and geographical divisions. Table I., on next page, will be found, by those who study it carefully, to embrace a great number and variety of results, expressive of the relative prevalence of different forms of pulmonary inflammation in the different seasons of the year, and in different localities, through a period of 10 years, reduced to a mean year. The decimals in the table might have been carried to two or three figures, but it seemed better as far as possible to avoid fractions.

It may be advantageous to readers not conversant with statistical tables, to illustrate the use of this by an example. Let us then select two inland posts far distant from each other, and compare them, according to the numbers of the table. If 1000 soldiers should pass a year at Fort Snelling, 44° 53′ lat. N., there would be 643·3 attacks of pulmonary disease; viz.: in the first quarter of the calendar year 135·7 cases of catarrh, influenza, and bronchitis; in the second, 207·6; in the third, 120·8; in the fourth, 136·0 = 600. Of pneumonia and pleurisy there would be in the several quarters, 12·2; 25·3; 11·2; 12·0 = 40·7. Of phthisis there would be in the year 2·6, making an annual aggregate of 643·3. When we return to the line for Fort King, 28° 58′ lat. N., we see the numbers which correspond to these, which need not be written out like them, but may be placed with them for comparison as follows:—

	Catarrh, Influenza, and Bronchitis.	Pneumonia and Pleurisy.	Phthisis.	Total for the year.
Fort Snelling, ...	600	40·7	2·6	643·3
Fort King, ...	101·2	30·7	9·8	141·7

Thus it is revealed to us that the rigorous climate of Fort Snelling is far more productive of mucous inflammation than the milder climate of Fort King—that in pneumonia and pleurisy they differ much less, and that in phthisis the numbers are reversed, that disease prevailing more at the southern than the northern post. By thus comparing places similarly situated as to land and water, but in different latitudes, or differently situated in these respects but in the same latitudes, we augment our knowledge of the relations between various portions of our Valley and the pulmonary phlegmasiæ. But large portions of the Valley may be compared with each other, by bringing together the averages in the left horizontal line of each section of the table: which also presents data for ascertaining the relative influence of the seasons.

Fort Niagara, . . .	81·0	96·4	60·0	117·6	355·0	14·7	8·9	2·0	5·5	30·1	7·4	5·8	0·0	7·3	20·0	3·0	5·8	0·0	1·8	10·1	415·2
Fort Gratiot, ...	134 4	112·8	37 8	144·7	429·7	4 5	17·1	0·0	5·8	27·4	10·2	14·8	8·7	8·1	41·8	0·0	2 8	1·5	1·0	5·8	503·7
Fort Dearborn, . . .	45·0	14 8	10·8	32·0	102·1	1·5	1·8	0 0	1·8	5·1	9·0	9·4	6 9	8·9	34·1	1·5	0 0	0 0	1·8	3·3	144·7
Fort Winnebago, . .	105·5	49·2	52 8	84 0	291·0	3·3	2 7	0·6	0·6	7·2	3·9	10 6	1·3	3·2	19 0	0·6	1 3	4·0	0 6	6·5	323·7
Average, ...	103·1	62·2	49 2	98 6	317·2	4·8	6 7	4·3	4·1	20·0	7·1	9 5	5·7	6 4	28·6	1·8	1·7	1·5	1·4	6·5	378 3
INLAND POSTS.																					
Fort Snelling, . . .	135·7	207·6	120·8	136 0	600·0	1·9	1·3	2·1	0·7	6·0	10·3	4·0	9 1	11·3	34·7	2 6	0·0	0·0	0 0	2 6	643·3
Fort Crawford, . . .	179·5	145·7	78·0	196·5	599·7	3·6	3·4	1 0	7·5	15·5	11·4	5·1	9 0	16·0	41·5	1·8	1·1	2 6	1·6	7·1	663 8
Fort Armstrong, . .	144·1	86·1	34·2	79 0	343 4	4·5	5·6	0 0	4·9	15 0	9 0	13·1	5·4	11·5	39 0	0·0	1·9	1·8	1·7	5·4	402·8
Fort Leavenworth, . .	205 4	60·4	21·3	89·3	376 4	7 0	8 7	4·5	0 9	21·1	10 8	9·3	2·5	7·5	30·1	5 2	2·7	0 0	1·9	9 8	437·4
Jefferson Barracks, . .	100·5	39·9	30·5	123·9	294·8	13·9	2 7	3·1	8·0	27·7	25·8	11·8	9·8	17·4	64 3	2 4	3·4	5·2	4·0	15 0	401 8
Fort Gibson, ...	127·2	65 6	18·0	62 6	273·4	45·7	8·7	3·9	6·3	64 6	25·6	10 2	4·6	8·6	49 0	3·0	1 8	4·0	1 7	10 5	397·5
Fort Smith, ...	114·6	9 6	92 7	63·4	280 3	0 0	9·6	7·4	9 7	26 7	7·9	4·8	0 0	4·8	17·5	4 0	0 0	0·0	0·0	4 0	328 5
Fort Towson, ...	34 5	20·8	26·8	30·2	112 3	19·0	4·8	0·7	12 2	36·7	6·0	8·3	4·9	7·1	26 3	2·7	4 2	1·4	1·4	9 7	185·0
Fort Mitchell, . . .	80·0	19 3	0 0	23 2	122·5	2·6	1·3	0·0	3·9	7·8	25·0	0 0	0 0	2 0	27·0	1·2	0 0	1·0	2 0	5·1	162·4
Fort Jessup, ...	186·7	108 7	60·6	76 8	432·8	6·5	3·0	1·7	2·5	13·7	12·2	19·5	8 6	21·4	61·7	2·2	3·0	2 6	0·9	8·7	516 9
Average, ...	136·5	82·7	53·7	95·3	368·2	13·6	5·3	2·7	4·6	26·2	13 2	9·5	6 0	11·7	40·4	2·7	1·9	2·0	1·5	8·2	443 0
Average of six South Inland Posts, . . .	102·2	44·0	38·1	63·3	252·7	14·6	5 0	2·8	7·0	29·5	17·1	9·0	4·6	10·2	61·0	2·6	2·1	2·5	1·7	8·8	332·0

TABLE V.

SHOWING THE RELATION OF DISEASES OF THE RESPIRATORY ORGANS TO ALL OTHER DISEASES, EXCLUDING ACCIDENTS AND VENEREAL AFFECTIONS.

FOUR NORTHERN INLAND POSTS.

Fort Snelling, as 1 to . . .	2·0
Fort Crawford, as 1 to . .	3·0
Fort Armstrong, as 1 to . .	3·8
Fort Leavenworth, as 1 to .	4·8
	3·4 mean.

SIX UPPER LAKE POSTS.

Fort Brady, as 1 to . . .	2·5
Fort Mackinac, as 1 to . .	3·7
Fort Howard, as 1 to . . .	4·2
Fort Winnebago, as 1 to . .	1·7
Fort Gratiot, as 1 to . . .	4·3
Fort Dearborn, as 1 to . .	8·0
	4·4 mean.

TWO LOWER LAKE POSTS.

Madison Barracks, as 1 to .	3·4
Fort Niagara, as 1 to . . .	4·0
	3·7 mean.

SIX SOUTHERN INLAND POSTS.

Jefferson Barracks, as 1 to .	6·6
Fort Gibson, as 1 to . . .	8·2
Fort Smith, as 1 to . . .	8·4
Fort Towson, as 1 to . .	12·2
Fort Jessup, as 1 to . . .	4·0
Fort Mitchell, as 1 to . .	12·4
	8·6 mean.

EIGHT GULF POSTS.

Baton Rouge, as 1 to . .	13·6
Fort Pike, as 1 to	5·0
Fort Wood, as 1 to . . .	5·7
New Orleans Barracks, as 1 to	6·5
Fort Jackson, as 1 to . .	13·2
Fort King, as 1 to . . .	13·9
Fort Brooke, as 1 to . . .	7·9
Fort Key West, as 1 to . .	13·4
	9·9 mean.

Mean of twenty-six posts as 1 to 6·992, say 7·00.

Let us turn our attention to the conclusions which may be drawn from the data furnished by these tables, considering the groups of posts *seriatim*.

I. Lower Lake Posts.—Fort Niagara is situated at the entrance of the river bearing that name, into Lake Ontario, near its western extremity; and Madison Barracks, at Sackett's Harbor, is on the eastern extremity of the Lake. Of all the "great lakes," this is the smallest and most detached from the group. To the southeast, at no great distance, lie the mountains of New York and Vermont; to the north of both posts, and to the north and northwest of the barracks, there is land. Thus, although *literally* lake posts, the lacustrine influences are very much reduced; which approximates them in condition to the inland posts of corresponding latitudes, which they even exceed in the high ratio of pulmonary diseases. But there is another cause for the same result. Ontario is the source of the river St. Lawrence, which reaches the Atlantic Ocean by a northeast course, and hence the posts upon its shores are peculiarly exposed to the northeast winds which traverse the continent from the Gulf of St. Lawrence to the Gulf of Mexico. By this great atmospheric current, the chill and damp air of the ocean off Newfoundland, in the latitude of 50°, is wafted over these posts; and to it we may ascribe in part the great prevalence of pulmonary inflammation. The ab-

but are greatly exposed to those from the west and northwest, as they descend from the Rocky Mountains over the arid inclined plain which stretches from those mountains to the trough of the Mississippi. The ratios of pulmonary disease at Fort Crawford and Fort Snelling, the two northern of these posts, are greater than any others except Madison Barracks, nearly in the same latitude. The ratios of Fort Armstrong and Fort Leavenworth, lying further south, are only two-thirds as great. The mean of the whole, a little less than that of the lower Lake or Ontario group, but almost twice as high as that of the Upper Lake group; a difference which connects itself with catarrh and pleurisy; the former rising nearly 100 per cent., and the latter 33 per cent. above the lake group, while in pneumonia and phthisis, the two groups are nearly equal. The distribution through the quarters of the year of the pulmonary diseases of this group conforms to the law of extreme variation of the temperature. Thus the number of cases of catarrh in the first quarter is twice as great as in the upper lake group, in the second more than twice, but in the third only 25 per cent. greater, while in the fourth it is greatest of all, showing the influence of the lakes, warmed by the summer, in moderating the violence of autumn. Compared with *all* the posts, this group is 71 per cent. above the general average in catarrh; 33 per cent. below it in pneumonia, and nearly equal in pleurisy and phthisis. In the aggregate it is above all the groups except the Ontario or lower lake, which it nearly equals. The number of pulmonary inflammations in this group compared with all other diseases, is as 1 to 3·4, while the ratio of all the posts is 1 to 7, or less than half as great; that of the adjoining upper lake group as 1 to 4·0, or seventeen per cent. less; that of the lower lake as 1 to 3·7, or nearly 9 per cent. less. Thus the proportion of pulmonary to all other diseases in the northern inland, is greater than in any other group.

IV. Southern Inland Group.—This group, comprising six posts, lies, with the exception of Fort Mitchell, which is situated on the eastern edge of Alabama, directly south of the last, and has to its west the inclined plain which ascends to the Rocky Mountains. The mean aggregate of pulmonary disease is 333·7, that of the group above being 538·8. By examining the general table, it will be seen that the posts of this group present a regular decrease from Jefferson Barracks, the furthest north, down to Fort Jessup, the most southern, which last, however, constitutes a striking exception on the scale of diminution, as the number of its cases is 517, being more even than that of Jefferson Barracks. No explanation of this anomaly is presented in the Army Statistics by the surgeons of the post, or by Dr. Forrey in his comments on them. We only know that the Fort is situated on an elevated and arid pine plateau, between Red River and the Sabine, at the distance of 100 miles in a direct line from the Gulf of Mexico. Let us for the present exclude this post, and proceed to inquire into the ratio of decrease in bronchial inflammations, as we descend through the whole range

of inland posts from Snelling and Crawford in the mean latitude of 44° down to the mean latitude of Towson and Mitchell, which may be taken at 32°. Between these parallels there are five other posts. Now the mean ratio of cases at the two upper posts is 600, that of the two lower nearly 120—difference 480. If we divide this by 12, the difference in latitude, it gives us a quotient of 40; which is the decrease for each degree of latitude in advancing from north to south. We are not at liberty to exclude Fort Jessup, but join it with Towson and Mitchell: we have an average of 222 for the catarrhal affections of the southern part of this group; which reduces the ratio of diminution through the 12° of latitude from 40 to 31·5 for every degree. The decrease is not, however, equable; still it is sufficient to show, that as we traverse the centre of the continent from North to South, catarrh and other bronchial affections diminish.

The other pulmonary affections do not conform to this but to an opposite law. Thus in the northern inland group the catarrhal cases are to all others as 480 to 59; while in the southern the ratio is 253 to 101. In fact, while catarrh diminishes as we go south, pneumonia, pleurisy, and phthisis increases.

In the southern inland group, the proportion of cases to the number of men, is as 1 to 13·2; in the northern, as 1 to 7·3. In the former, the number of cases of pulmonary disease compared with all others is as 1 to 8·6; in the latter, as 1 to 3·4. Thus in the northern group, pulmonary diseases bear a higher ratio both to the number of men and to other diseases than in the southern group.

V. Group of Gulf Posts.—These extend from Baton Rouge, in lat. 30° 36′, to Key West, in lat. 24° 33′—that is, through 6°. Baton Rouge and Fort King are situated about 50 miles on a straight line from the Gulf, the rest are on its margins. These posts present much irregularity in the numbers which express the relative prevalence of the different forms of pulmonary disease, but no law of increase or decrease through the 6° of latitude. Thus the two extreme posts, Baton Rouge and Key West, present the same amount of catarrh; Fort Brooke gives more than Fort King or Fort Jackson, although further south than they, and Forts Pike and Wood differ widely in their numbers, notwithstanding they lie in the same locality. Similar remarks would be equally true of the other forms of pulmonary disease. But let us compare this group with the last which rests upon it to the north. The difference between them is, catarrhal cases, 19·7, pneumonia, 13·5, pleuritic, 24·2, phthisical, nothing. These differences give 13·76 and 65 per cent. Hence it appears, that around the Gulf the cases of catarrh approach much nearer to the cases in the adjoining group of posts to the north, than the cases of pneumonia and pleurisy. In other words, the influence of the Gulf coasts, in reducing the ratio of pneumonia and pleurisy, is greater than its influence in abating catarrh. The last disease is, in fact, more prevalent in this group, compared with the southern inland group,

an it is in that group compared with the northern. This is demonstrable. r example, between the centres of the two inland groups there are 9° of itude, and the difference in the ratio of catarrhal cases is 228; from the ntre of the southern inland group to that of the Gulf, there are 6° of latie, which, at an unaltered ratio, would give 148 as the difference of cases, ereas, it is only 30. Now, why is it, that as we reach and continue ith on the shores of the Gulf, the ratio of decrease in catarrh is retarded? ere is no obvious cause but the Gulf itself; in what manner, however, es it favor the production of catarrh, or counteract the influence of inased heat in diminishing that disease? A mixture or alternation of land d sea air may perhaps be the cause.

That it is not referable to mere humidity will appear on comparing the ulf posts with the upper Lake posts. Although situated 16° further rth, in the same parallel with the northern inland group, the Lake group esents the low ratio of 264 for catarrh and 310 for all pulmonary disses, while the Gulf posts give us 223 and 288. Thus 1000 men on the ores of the northern Lakes will afford but 41 cases of catarrh and only cases of all kinds of pulmonary disease more than the same number on e shores of the Gulf. In fact, while catarrh is a little *more* prevalent, ner forms of pulmonary disease are less so on the upper Lakes than on the ulf, which demonstrates that the vapor of fresh water does not tend to oduce pulmonary disease, since the difference of temperature alone ought give a greater number in the North than in the South.

In the group of Gulf posts, the proportion of pulmonary disease to all bers, was one to ten; in the group immediately north, as one to eight d six-tenths; the proportion of the same disease to the number of men one to fifteen in the former and one to thirteen and two-tenths in the tter.

III. Let us turn our attention to the Canadian statistics of the British my.* It is not practicable to incorporate these with the statistics of our n, because the returns of different posts are not given, nor are quarterly riods observed. The posts of Upper Canada West are Penetanguishire, Lake Huron, Amherstberg, or Malden, on Lake Erie, and Fort George, oronto, Bytown, and Kingston, on or north of Lake Ontario. The posts Lower or East Canada are Montreal, on the River St. Lawrence; Isle Noix, St. John, Chambly, and William Henry, on the Richelieu, which nnects Lake Champlain with the St. Lawrence; lastly Quebec, the most stern and northern of the whole.

It appears that for a period of twenty years, during which the aggregate ces at these and all other posts in the two Canadas was 64,280, the mber of cases of pulmonary disease was 9,061, or 140 per 1,000 mean rength, a prevalence far below that of any of the posts of the United ates, even those of the South.

* Tulloch's Reports, London, 1839, p. 28, b.

The following are the forms of pulmonary disease in the 9,061 cases:—

Inflammation of the lungs,	2,774
Spitting of blood,	129
Consumption,	402
Acute catarrh,	5,135
Chronic catarrh,	569
Asthma,	39
Difficulty of breathing,	11
Pain in the chest,	1
Hooping cough,	1
Total,	9,061

The difference between posts and those of the adjacent parts of the United States, is not und in phthisis, pleurisy, or pneumonia, but in catarrh. Fo ion of phthisis, the same of pleurisy and pneumonia nearly of catarrh much less.

The relative prevalence isease in Upper and Lower Canada during 10 years, is presen wing table:—

	A.	LOWER CANADA.	
			Per 1000 mean strength.
Inflammation of lungs,	30	60	
Consumption,	5	7	139
Catarrh,	45	72	

From this table, it appears that the Canadian posts on the Lakes are but more than half as liable to pulmonary disease as those on the St. Lawrence; showing conclusively the influence of large bodies of water in diminishing the production of those diseases. According to Major Tulloch, some allowance should be made, however, for soldiers from the upper posts stopping at the lower, when on their way to England, to be invalided; nevertheless, we are warranted in saying that the country to the east of the great lakes, not less than that to their west, is more subject to pulmonary diseases than the intervening or lacustrine region.

The army statistics of the two nations, which we have presented, show in a general way the connection between climate and pulmonary disease from the Gulf of Mexico and the Gulf of St. Lawrence, as observed among soldiers; but we must not neglect observations made in civil life, although they may be less exact and extensive.

IV. Wherever I have travelled within the limits just mentioned, pulmonary inflammations have been enumerated both by physicians and the people among their prevalent diseases; some form or grade of catarrh or bronchitis, being always more frequent than all other affections of the respiratory organs taken together. The inhabitants of both city and country are liable, but whether in the same degree I am unable to state. My im-

ession is that the country population are more subject to pleurisy and pneu-
nia than the city, while catarrh is nearly equally common among both.
Everybody expects catarrh and other pulmonary diseases, when a sudden
ange of weather takes place. Even a change from cold to heat sometimes
oduces catarrh; but in most cases it is the opposite transition which
iginates the local epidemic. Now it is worthy of remark, that many sud-
n changes occur every year, without generating much catarrh; and also,
at it is not uncommon to see that form of disease exceedingly prevalent
ien the changes of temperature have been very slight. Indeed, every ob-
rving physician in our middle latitudes must have remarked, that during
e dry and frosty weather of autumn, when the temperature is uncommonly
iform, catarrhs are sometimes quite epidemic. Long-continued observa-
ons on the thermometric, hygrometric, and electrical conditions of the
mosphere, in connection with catarrhal invasions, might perhaps explain
ese apparent anomalies. Yet I have been tempted to conjecture that
mething more than modifications of heat, moisture, and electricity, is in
ocult) action in the case; and since the remarkable facts observed by
chönbein, in connection with the presence in the atmosphere of what he
s called ozone, the conjecture has been strengthened. It may be that the
sible changes are not the immediate causes, but that they produce some
meric modifications in the atmosphere which do the mischief, and this
onjecturally) may be the reason why the apparatus of respiration suffers
ore than all other parts of the organism.

SECTION II.

MISCELLANEOUS CAUSES OF PULMONARY INFLAMMATION.

In the inquiry in which we are engaged were limited to the causes of
imple acute pulmonary inflammation, we might stop here; but as it em-
races the chronic, whether simple or tubercular, we must extend it to
ther agents which are known, or supposed, to be injurious. We begin
ith

I. Cotton-Fuzz.—As the southern portions of the Interior Valley pro-
uce and prepare for market the larger part of the cotton used in Europe,
nd moreover supply the whole United States; and as the manufacture of
is staple is increasing throughout the Valley, it is important to ascertain
e effects of its fuzz on the respiratory apparatus; this I have endeavored
o do, but have not been as successful as I could have wished.

The gin is a machine of rapid motion for eliminating the seed from
tton. It throws an immense amount of broken fibres or fuzz into the
mosphere, which are of necessity taken into the lungs of those who con-
ct the operation, who are generally negroes. The period of ginning does

not last very long, nor are a great number of operatives necessary to the management of a gin. When travelling in the South, I learned that proprietors do what they can to promote ventilation, avoid their gin houses, and avoid employing men who are predisposed to pulmonary disease, and often change them, so that no one shall inhale the fuzz very long. These precautions indicate, as the public opinion, that it *may* do harm, as indeed it undoubtedly does, but to a less extent than might perhaps be expected.

Dr. Harrington, formerly of North Alabama, informed me, that he had observed the cotton-ginners to be affected with a kind of bronchial consumption, which was attended with a thin yellowish expectoration. He had seen three fatal cases. Dr. Ames, of Montgomery, in South Alabama, writes me: "I have made inquiry as to the effect of cotton-ginning on the lungs, and find that it almost always produces an increased secretion from the lining membrane of the air passages, from the nose downwards, with a cough, a disorder which the planters call a cold. It is so slight, however, that a physician is rarely consulted, and it generally passes off as soon as the ginning time is over. I do not remember to have been applied to on account of it more than twice, and then the complaint was a very mild bronchitis. I have been informed by one of the oldest and largest planters in this county, that he owns a negro, who has ginned for him a great many years, and is now a very healthy old man. The physicians in this town and its vicinity agree, that the ginners are not more liable to serious diseases of the lungs than other negroes." In the Session of the University of Louisville, for 1846–7, I desired such of the students from the cotton zone, as knew of any facts bearing on this subject, to communicate them. Five responded to the request. Mr. T. W. M'Leroy, of Tuscaloosa, Alabama, knew a negro man, of well-developed chest and sound lungs, who had for ten years been a cotton-ginner, every winter for three months. The occupation did not appear to produce actual bronchitis, but he was affected during the winter with irritation and increased secretion from the mucous membrane. Mr. W. Taylor, of Talladega, in the same State, is quite certain, that in the region where he resides, those who continue long at this employment are seriously injured, becoming affected with bronchitis, asthma, and phthisis. His preceptor, Dr. M'Cazie, has had many such patients. Mr. W. A. Pegues, also, of the same State, has seen many cotton-ginners seriously affected in their lungs by that occupation. In some cases actual bronchitis has been produced. His father, an extensive cotton-planter, has long been so well satisfied of the fact, that he has adopted the rule of frequently changing the hands employed about the gin, so that no one shall breathe the impure atmosphere more than a few weeks. Mr. W. J. Dupree, of Mississippi, has never observed any other ill effects from ginning, than a slight catarrhal affection, accompanied with a hacking cough, which passes away soon after the season is over, leaving the individual in as good health as he was before. He knows a negro man who has attended the gin more

or less every winter for fifteen or twenty years, and remains quite free from pulmonary disease. Such cases he thinks are not rare. Mr. A. E. Thomas, of the same State, says, "This subject is one of great interest with all our intelligent planters, as the effect of cotton-ginning on their negroes is very deleterious; so injurious, indeed, as to be obvious to the negroes themselves, who endeavor to avoid the gin-house. Planters select their oldest and least valuable negroes for this occupation, knowing that the healthiest and most robust will, in a year or two, become diseased. To prevent these bad effects, it is not uncommon to make them wear and breathe through a veil, and give them molasses and water to drink, measures which appear to be generally effective. If a person not accustomed to breathe the air of a gin-house, goes into it while the machine is running, he is soon seized with a tickling sensation in his nostrils, followed by sneezing, coughing, and some degree of hoarseness. Continuing awhile in this situation, he begins to feel his nostrils stuffed up. After leaving the place he will have symptoms of a cold for several days. Remaining longer there, the stuffing of his nostrils may become so great as to prevent his breathing through them. The cough attendant on this affection is often dry, or small quantities of mucus, in which the lint and dust floating in the air have been entangled, will be thrown up. A feeling of soreness pervades the trachea and bronchial tubes. I have known several to have chronic bronchitis. I saw one death preceded by the discharge of an abscess from the lungs, and another die of phthisis, following on bronchitis. It is the custom every two or three weeks to stop the hands from field labor, to bale the gin and cotton, at which they are commonly occupied two or three days. Before the end of this period they are apt to become affected with sneezing, coughing, and other catarrhal symptoms, which often continue for several days."

It appears from these various statements, that a cotton catarrh or bronchitis is a reality in the South; but that the constitutions of some of the operatives either resist the irritation of the fuzz or become reconciled to it, as happens with the inhalation of an atmosphere impregnated with chlorine; or the emanations from a coal fire, which often for a time excite coughing, dyspnœa, and headache in the unaccustomed, and then lose their effect.

II. Hemp mills abound in Kentucky, and the operatives are both white and black. Hemp is also manufactured in several of the penitentiaries of the States south of the Ohio.

[I think it proper to insert the following extracts from letters written to the author, evidently in answer to inquiries propounded by him.—Ed.]

Dr. Jno. A. Ingles, of Paris, Kentucky, says: "From all that I have seen and heard from those who have enjoyed ample opportunities of making observations, I am impressed with the belief that hemp fuzz has but little effect in exciting disease in those who are even constantly exposed to its influence. I have heard a gentleman of age, who has been nearly all his life engaged

in the manufacturing of hemp, say that he believed that negroes, employe from year to year in hemp factories, are, on the whole, more healthy tha they would be in any other situation."

[The following memorandum is by Dr. Drake.—Ed.]

Mr. Wm. M. Walker, of Cincinnati, who has been an owner of bo cotton and hemp manufacturing establishments on the banks of the Ohi has assured me that the cotton atmosphere is more insalubrious than t hemp. Indeed he regards the latter as nearly innoxious.

Dr. G. W. Bayless, of Louisville, in a letter dated March 9th, 184 writes: "This establishment (the Louisville Hemp Manufactory) has be in full operation since January, 1840, during the whole of which time have attended to all of the black hands, and a few only of the white. Th blacks have averaged about 60 or 70, and the whites about 30 or 40 number."

"In the course of the five years and better which have elapsed, besid the ordinary diseases of the seasons, I have met with two cases of phthis which proved fatal; one case of hemoptysis; one of dyspepsia, attende with troublesome cough, of considerable duration, and one of amenorrhœa.

"The first case of phthisis occurred in a young negro man, nearly fu negro, about twenty years of age, who worked in the first machine depar ment, where there is a good deal of dust, and which was not at that tim well warmed. His father and mother are still living, quite old and healthy He had a half brother who once had a troublesome cough, lasting a year o more, whilst engaged in rope-spinning; but he still continued at that work and is yet a stout man, after having been engaged at it for fifteen or twenty years. He also had a full brother, who, when about three or four years old had scrofulous enlargements and suppuration of the cervical glands; but, who recovered from it after several months, and is now a stout boy of fifteen years."

"The subject himself had always been entirely healthy, and was about five feet six; compact, and more than ordinarily muscular. He was uncommonly free from the vices of such boys. When he had been engaged about six months in the occupation spoken of, he was seized with acute phthisis, and died in about three months. No *post-mortem* examination was made."

"The second case of phthisis occurred in a negro boy (full negro) about ten years of age. I know nothing of his parentage or history. Before his attack, he was about as stout as negro boys generally of his age, and presented no indications of delicate constitution that I am aware of. He was engaged in the spinning department; but I am not able to say how long he had been there; it was either three or fifteen months; and I am inclined to think the former. In March, he was seized with symptoms which at first looked like mild pneumonia, but in three or four weeks, it became manifest that the disease was acute phthisis; and in between two and three months he died. No *post-mortem* was made for want of an opportunity."

"Besides these, there is a man engaged in hatchelling. He has been at it for two or three years; and frequently complains of pain and oppression of the chest, attended with hoarseness, amounting almost to aphonia. But he still continues stout and able to perform his laborious work."

"The boy already spoken of, who had, when a child, scrofulous affection of the cervical glands, is also subject to a similar hoarseness if put at spinning, or any work which exposes him to much dust. He has been put to reeling rope, where there is but little dust, and he remains free from the hoarseness."

Dr. W. C. Sneed, of Frankfort, Ky., observes: "By reference to the case-book in the Penitentiary, I find that thirty-four patients have entered the Hospital during the last three years with disease of the lungs, viz.: pleurisy, pneumonia, and bronchitis, and that all of these, with the exception of one, came from the hemp shops. There are, on an average, ten men employed in hatchelling, fifteen in weaving, &c., and from thirty-five to forty-five in spinning. With the exception of diseases of the lungs, I do not perceive any difference in the number of admittances from the various shops. The hemp business gives nearly all the cases of disease of the lungs, and an equal proportion of other diseases. I perceive that all the cases of typhoid fever from the hemp-shops, have had bronchitis more or less during the course of their attacks. I find it often necessary to change individuals with *weak* lungs from the hemp-shops to other employments. We find that all persons threatened with, or actually laboring under, bronchitis or tubercles, have to be put at some other employment. The weaving and hatchelling seem to be the most unhealthy branches of the hemp business; the latter the most so, from the excessive quantity of particles continually floating in the atmosphere. None but the most healthy are able to labor in either of these branches, and when threatened with any difficulty in the lungs, they are immediately changed, and their places supplied by others. I am decidedly of opinion that but few men could withstand the effects of the dust in the hatchelling-house more than one or two years."

III. Our Interior Valley abounds in flour and grist mills, the atmospheres of which are thickly impregnated with impalpable powders, chiefly amylaceous. The phrase, "*only* a miller's cough," embodies popular observation in regard to these atmospheric impurities. They irritate sufficiently to excite coughing, but not, of themselves, to generate inflammation. Perhaps they may predispose to chronic bronchitis; and quite as likely may become an exciting cause of tubercular inflammation.

That catarrhal affection, denominated hay-asthma, has been ascribed to a floating farinaceous powder, the pollen of the grasses, cultivated for hay. I have seen but two cases of it, and both had annual returns, not at the time of *our* hay harvest, but in August, when our Indian corn (*Zea maize*), another grass, remarkable for the amount and strong odor of its pollen, is in full flower. These patients, however, were not agriculturists, but inhabitants

of towns; and I am not at liberty to ascribe their disease to such a cause, for in a country where Indian corn may be said to have replaced the forest, the annual impregnation of the atmosphere with pollen, would, if it were the cause of that malady, be likely to occasion a greater number of cases than occur, even admitting the necessity of a remarkable idiosyncrasy, as the predisposing cause. I have mentioned that, as a physician, I have seen but two cases; and may add, in further evidence of its rarity, and as strengthening the conclusion just expressed, that during my corn-field labors for many years in early life, I never saw a case.

IV. Mineral Impurities.—Respiring an air laden with mechanical impurities from the mineral kingdom, though not a cause of acute, may produce chronic mucous inflammation. But all impurities do not have this effect. Street dust consisting chiefly of comminuted clay and limestone, and the dust of charcoal and stonecoal, appears not to be capable of exciting inflammation, though its repeated inhalation may slowly establish in the lungs an organic lesion, as the spurious melanosis in those who work in coal. The dust of millstones, consisting chiefly of angular particles of silex, is mechanically irritating, and may occasion mucous inflammation, or promote the deposit of tubercle in the predisposed. There are but few establishments of this kind in the Valley. Stone-cutters' yards are numerous, and their atmospheres would abound in hard particles of carbonate of lime and sand, were the operations with the chisel not generally conducted in the open air, by the currents in which they are blown away.

In certain places around the northern Lakes and the Gulf of Mexico, there are dunes, in forming which, and from which, the wind drifts into the atmosphere great quantities of fine sand. Some of these localities have been charged with producing pulmonary diseases, among which we might expect to find subacute bronchitis. When visiting Pensacola Bay, where every breeze raises great quantities of white sea-sand, I did not meet with any conclusive evidence of its pernicious influence on the lungs, though it is a fact that many persons die of consumption at that place; not a few of them, however, emigrate from places further north for the purpose of arresting or warding off that malady. When travelling in the North, I was assured by Judge Lane and Dr. Tilden, both of Sandusky City, but formerly of Norwalk, that diseases of the lungs were more prevalent in the latter town than any other on the south side of Lake Erie. Judge Lane had indeed left it expressly for the purpose of arresting a subacute mucous inflammation of the respiratory passages. This prevalence they ascribed to sand; the town being built on a long sand ridge, from which the wind drifted and deposited great quantities in all the houses. When I visited that beautiful village, I found the topographical account of those gentlemen correct; but Dr. Baker and Dr. Kilteridge flatly denied that there was, or ever had been, any special prevalence of pulmonary disease among its inhabitants. Subsequently I visited Painesville, built on a continuation of the same sand ridge;

but could not learn that either chronic bronchitis or phthisis was more prevalent there, than in localities having an argillaceous surface.

V. Gaseous Impurities.—As these are chiefly found in manufacturing cities, they do not of course often injure the lungs in a newly settled country like ours. Pittsburg and Cincinnati are the only cities in which the chemical manufactures are carried on to any considerable extent. Carbonic acid gas and carburetted hydrogen are those to which we are most exposed; but they kill by a species of narcotism, and not by inflammation. On the other hand, nitrous acid vapor, ammoniacal gas, phosphorous acid, gaseous hydrochloric acid and chlorine, are inflammatory irritants to the bronchial membrane. The last, however, has a slightly narcotico-sedative property, under the influence of which it gradually diminishes in its irritating effect on that membrane.* The whole of these gases are developed in the manufacturing establishments already erected among us, and as they increase in number, these causes of laryngeal and bronchial inflammation will multiply.

VI. Flame, or gases in a state of combustion with a mixture of atmospheric air having the same temperature, it is supposed may be inhaled and burn the bronchial membrane. This, as far as I know, has not been demonstrated by *post-mortem* inspection. I have seen a case in which the flame surrounded the head and face, the patient being in bed; it proved fatal in less than twenty-four hours, without an external burn, sufficient apparently to occasion death; but as no dissection was permitted, it remains uncertain whether the flame entered the glottis.

A far more common accident is exposure to hot steam, by the bursting of boilers in our numerous boats and manufacturing establishments. That a scalding of the aerial passages above the rima glottidis may happen in these accidents is unquestionable; but I doubt whether it extends into the lungs, for steam brought in contact with any solid substance, loses its caloric with remarkable quickness; and, indeed, the loss of heat under mere expansion and diffusion is exceedingly rapid.†

VII. Mechanical Violence.—Punctured and gun-shot wounds, no uncommon lesions in this country, fall largely on the lungs, and of course excite inflammation; blows or falls on the chest may be followed by the same result, especially when a rib is fractured; employments which keep the thorax unnaturally bent or confined, may, at least, predispose to that effect, as may the lifting of heavy weights, or inordinately exercising the vocal organs.

* Christison on Poisons.

† In the year 183– the steamer Flora burst her boiler, on approaching Cincinnati. I had an opportunity of inspecting the condition of a large number of the scalded, and found in every instance, that the slightest covering had been a sufficient protection. In penetrating it the steam had lost so much of its heat as not to scald. This fact should instruct passengers to keep their bodies well protected at night with personal clothing, and to make the covering of their faces a first instinctive act, in the event of an explosion. Those however who might happen to be near the boilers would no doubt be scalded, for the great heat of the issuing vapor would raise their clothing to the temperature necessary to that effect.—(West. Jour., Cincinnati.)

VIII. Pathological Causes.—Pericarditis sometimes extends into the lungs and produces partial pneumonia. The same disease may be produced by suppurative inflammation of the liver. Burns or scalds on the thorax may be followed by pulmonary inflammation. Pharyngitis, either simple or scarlatinous, may dip into the larynx, and the latter sometimes generates pneumonia. The typhous fevers very often originate the same disease. Inflammatory dyspepsia and chronic hepatitis frequently awaken subacute bronchitis. A chlorotic state occasionally invites tubercular inflammation. The two great modifying causes of pulmonary inflammation are, moreover, in a certain sense pathological. They are the typhous and the malarious diatheses to which reference was made in a preceding chapter.

[The enormous and unprecedented development of arts and manufactures in the Interior Valley has doubtless added very largely to the sources of pulmonary disease. Among the occupations not alluded to by the author, but now very extensively carried on, in which the air inhaled by the workmen is much contaminated by the presence of mechanical impurities, may be enumerated coal and other mining and quarrying, moulding, brass-founding, edge tool and gun-barrel grinding, pearl and horn button making, wool carding, starch making, and attending on some of the patent planing machines. The manufacture of bone and ivory-black, and other forms of animal charcoal, and that of felt hat bodies, should also be mentioned here.—Ed.]

CHAPTER XII.

MUCOUS INFLAMMATIONS OF THE RESPIRATORY ORGANS—CATARRH, —INFLUENZA—LARYNGITIS, ACUTE AND CHRONIC.

SECTION I.

ENDEMIC CATARRH.

I. Symptoms and Pathology.—It is almost a solecism to place this affection among the phlegmasiæ; yet no other association could be so proper. A detailed history of its symptoms is unnecessary. It generally begins in the mucous membrane of the nares and collateral cells, with sneezing and a sense of fulness and dryness, soon followed by increased secretion, giving the defluxion from which its name is derived. The discharge, always watery in the beginning, is sometimes so acrid as to excoriate the upper lip. An increased secretion from the conjunctiva is not uncommon. The constitution is but little disturbed; but in some cases there is a sense of chilliness alternating with febrile flushes. This simple

being in popular phraseology a cause of consumption, many cases of which are distinctly traced up by the patient or his friends to his taking cold. He will say that he is "easy to take cold:" that as he gets well of one he is attacked with another. Now in every case of this kind, there is a tubercular diathesis, which predisposes to catarrh, and that little malady in turn becomes an exciting cause of tubercular inflammation of the lungs. If there should not be such a diathesis, repeated catarrhs presage chronic bronchitis, or non-tubercular consumption. They show an infirm and morbidly susceptible condition of the bronchial membrane.

The disease we have briefly considered results from indigenous causes, which may act on a single person, giving a sporadic disease; or on many at the same time, when it prevails accordingly, and constitutes an endemio-epidemic; it is then very commonly called influenza, but that name belongs more properly to the subject of the next section.

SECTION II.

INFLUENZA, OR EXOTIC, EPIDEMIC CATARRH.

I. History.—The cause of this malady is as utterly unknown, as the place where any one of its invasions commenced. I am unable to say how often it has traversed our Interior Valley, for its vast uniformity of surface leads to an extensive production of the endemic disease at the same time, when it is generally called influenza, and the means of distinguishing it from that malady do not exist. It is sufficient to know that we have been invaded by this exotic epidemic.

The first and greatest invasion of this kind, which I have had an opportunity of witnessing, occurred in the year 1807. In the summer or early autumn, the newspapers brought the intelligence of its prevalence in Europe, and afterwards that it had reached our eastern cities. It was in October, when the weather was fine and steady, that it appeared in this locality. Two regiments of militia, called into the field to repel from our frontier a threatened invasion of Indians, were at the time encamped a few miles out of town, and I was then in attendance upon them. These men were its *first* subjects, the people of the town still being healthy. In a few days, however, it reached the latter, and then sought out the scattered inhabitants of the country. At that time there was but little communication between our settlements, yet I was able to ascertain, that it "spread far and wide" among them.

I need not give the history of any other prevalence, as this illustrates the most constant of the laws which govern influenza; *first*, its progressive extension from east to west; *second*, its independence of all sensible conditions of the atmosphere; *third*, its first outbreak in bodies of men, and compact settlements.

redness is generally present. To complete the diagnosis, the lungs should be examined, both by an inquiry into the rational symptoms, and by percussion and auscultation, special attention being given to their apices, with a reference to deposits of tubercle, the ascertained existence of which would suggest a less copious depletory treatment.

II. TREATMENT.—When called early to a case presenting the symptoms, or a majority, which have been enumerated, this simple primary inflammation of the mucous membrane of the epiglottis, rima glottidis, and larynx may generally be subdued.

Bloodletting is, of course, the first and greatest remedy, and should be carried to approaching syncope, otherwise from its detached character of the afflicted part, in reference to the highways of circulation, its vascular system will not feel the loss of blood. Immediately after such a bleeding, an antimonial emetic should be given. Vomiting has been thought dangerous, from the inability of the epiglottis to close the entrance to the glottis securely; however, this may be I have certainly never seen suffocation produced by the act of vomiting in this disease. The associated physiological action between the pharynx and the stomach, is so intimate as to give to impressions made upon the latter great influence over the former. We have an example of this in the copious secretion from the throat which precedes vomiting. Now it can scarcely be otherwise than that this effect must extend to the larynx, so closely connected in anatomy with the pharynx, and so much affected in every act of deglutition. Purging should follow vomiting, and by administering tartarized antimony in a solution of sulphate of magnesia, it may be speedily effected. Subsequently the antimony should be administered in nauseating doses, combined or alternated with small portions of calomel, as an antiphlogistic alterant. A second venesection may be demanded, and should again be carried to the verge of syncope. But topical bleeding is not to be overlooked. Leeches may be applied on each side of the larynx, except when the patient is aged, of a soft or lymphatic temperament, or shows any signs of a hydropic diathesis, when their bites might be promotive of œdematous infiltration. Cupping on the nucha is not, however, liable to these objections, after which a blister may be applied to that part. Warm poultices to the larynx, and wrapping the throat with flannel, are common applications, but can scarcely be of other use than to exclude the action of the outward air, ever varying in temperature. Surrounding the neck with towels dipped in cold water is a practice I have not seen tried, but, from analogy, why should it not be useful? The inhalation of steam as a means of soothing the inflamed membrane and promoting secretion, is a popular practice which seems to be well founded. As much as the dyspnœa attending on this disease, arises from the spasmodic action of the muscles which regulate the aperture of the glottis, the exhibition of a watery infusion of assafœtida in mucilage of gum Arabic, might after due evacuation prove beneficial. Such are the remedies for acute, simple laryngitis,

In the diagnosis of this variety, we scarcely have the aid of one reliable, differential symptom. If the tongue be depressed by the finger or a non-metallic spatula, of the temperature of the body, and the patient be directed to make a deep respiration, or a sudden effort to cough, the apex of the epiglottis is sometimes brought into view, under the aspect, according to Halse, of a dark red conical tumor, projecting behind the root of the tongue. The exhibition obtained by coughing is almost too momentary to be instructive. Stress may be laid upon external œdema about the upper part of the larynx, but it does not appear in every case; and when present has sometimes been observed to precede the inflammation; it is not on that account, however, the less pathognomonic, as it shows, in the system, a tendency to serous infiltration, which inflammation could not fail to quicken. In most cases, then, the diagnosis must be drawn from the symptoms enumerated under the first head, but not in reference to a greater intensity of those which indicate inflammation; but those which show the lesion of respiration. In fact the inflammation in this modification is often less violent than in the preceding, while the dyspnœa resulting from the conditions which have been pointed out is much greater. The common subjects of this variety are those who have infirm constitutions, or who like its noblest victim, our own Washington, are advanced in life. Such subjects, although less liable to acute inflammation with fibrinous effusion, are more liable to serous infiltrations. *The general signs of laryngitis being present*, a rapidly ingravescent dyspnœa, accompanied with anxiety, a disposition to sit up in bed, greater difficulty of inspiration than expiration, a sudden failure of voice, and stridulous sounds in breathing, would leave no doubt as to the character of the disease. But in the previous or present absence of the signs of inflammation, these symptoms might and should be referred to spasm—laryngismus stridulus. When, however, the disease is farther advanced, and defective aeration of the blood begins to develop a smoky or purple tint of the gums, lips, and other parts of the surface, the diagnosis is as complete as the danger is then imminent. This method of ascertaining the existence and nature of morbid actions, by the ravages they produce, is, however, the last on which a physician would desire to rely.

The treatment, generally successful in simple laryngitis, is by no means as reliable in the variety now before us; which, although happily rare, is very often fatal. Assuming that the urgent embarrassment of respiration was a true index of the intensity of the inflammation, which, as we have seen, it is not, great stress has been laid upon bloodletting.

Before any discoloration of the skin has appeared, there can be no doubt of the propriety of bleeding to syncope; and there may be cases which would be benefited by repeating the operation; but in feeble constitutions, the sudden and extensive loss of the red corpuscles may promote the serous effusion, which is the great source of danger. After the signs of a carbonated condition of the blood have appeared, a venesection may still be admitted

prove fatal by inducing laryngeal or glottideal inflammation, and have, already mentioned the ulcerative erosion of the base of the epiglottis, till it fell over and obstructing the rima, produced instant suffocation, in a child apparently far advanced in convalescence. This malady is sometimes consequent on a mercurial course, but oftener of syphilitic origin. I have seen it arise from organic disease of the heart, but above all it may be tubercular—either going before, or following, a similar affection of the lungs. That which results from inflammation of the throat, from erysipelas, scarlatina, and the other exanthems, is often acute—the other forms are more chronic. Of course the treatment of each must have a relation to the disease of which it is a part. Of the whole, the tubercular, in this country is most frequent, and must come up for further consideration with Phthisis.

SECTION IV.

CHRONIC LARYNGITIS, DISEASE OF PUBLIC SPEAKERS,* CLERGYMAN'S SORE THROAT.

I. History and Diagnosis.—Acute laryngitis may degenerate into chronic; but the inflammation may also be subacute from the beginning. It is often imperceptibly ingravescent, and becomes acute, but may also be suddenly raised to intensity by exposure to cold. The worst cases I have seen were in males who had not reached, or passed, the meridian of life. A considerable redness of the visible parts of the throat, in some cases, shows the presence of chronic pharyngitis. The uvula is also occasionally elongated and œdematous.

The expectoration is generally sparing. The cough, always present, is felt by the patient to result from an irritation of the larynx, especially of its upper extremity. It varies much in its character. The patient frequently calls it a dry cough. It is sometimes hacking, at other times violent and spasmodic. In some cases it is hoarse and harsh, in others quite flat. Percussion or pressure always excites it, so that it is sometimes difficult to apply the stethoscope over the thyroid cartilages. Even a sudden inspiration, causing unusual expansion of the glottis, and carrying through the rima a rapid current of air, may bring it on. All examinations of the throat are apt to produce the same effect. The voice invariably suffers. The patient can no longer modulate it. Singing is at an end. It becomes hoarse or husky, then flat, and often sinks into a whisper.

The febrile excitement varies exceedingly in different cases, and even in

* It is unfortunate, and still more marvellous, that this disease should have usurped the name of another, *bronchitis*. Some sciolist in anatomy, either medical, clerical, legal, or political, who, to use a phrase for which our language furnishes no adequate substitute, did not know "head from tail" of the respiratory system, must have started it; and as every one knows everything better than the structure of his own body, this nosological error has been wafted by the breath of the *learned* over our whole Valley.

chills, evening exacerbations, and morning sweats indicate the development of *non-tubercular, laryngeal consumption.* It is now still more important than before, to determine whether the lungs be involved; and if so, whether it be simple bronchitis or tubercular inflammation. This, happily, can be done with much certainty, as the signs of both these maladies, if they exist, will now be well developed; and their absence will fix the hectic fever on the inflammation of the larynx.

II. Regimen and Remedies.—The first point is to obviate every producing and exciting cause. Whether an abuse of the voice have or have not been one of these, a reduction in its use to the degree which is barely sufficient to express the wants of the patient is indispensable. Many persons suppose that to leave off public speaking or reading is sufficient, but it is not; for *earnest* conversation, even on the lowest key, may do much injury.* We meet with patients who carry out this self-denial till they are, as they suppose, quite well, and then return to their old habits. In general this reproduces the disease, and whenever the disease has existed for a while, it is better for the physician to advise a change of profession or occupation for life.

Simple, idiopathic laryngitis is much influenced by the weather. A cold, humid, and variable atmosphere never fails to aggravate it, and is one of the causes which raise the inflammation into acuteness. Here then we have phlegmasia of the respiratory apparatus which may be alleviated by spending the winter in a southern climate; and this step will be as proper when from the progress of purulent secretion the malady has taken the form of non-tubercular, laryngeal phthisis, as before.

In the early stages of this malady exercise is not proper, but after it has endured long enough for the inflamed larynx to spread an enfeebling influence though the organism, and especially after purulent secretion, with simulative hectic fever has commenced, exercise in the open air is of much value. This may be had by going South in autumn and North in spring. Thus without being exposed to the sudden changes of weather, the invigorating influences of exercise in the open air, in many cases so promotive of the cure of slow and indolent inflammations, may be obtained; and will be especially obvious when purulent secretion has commenced. When journeys are not convenient, field work, or jaunts on horseback, or in-door labors in dry apartments free from atmospheric impurities may be substituted.

In the earlier stages a rigid diet is required; but in the more advanced, when hectical symptoms show themselves, it may be more generous. Throughout the whole, milk will be proper.

The question often comes up whether smoking is injurious. I know of no facts going to show that tobacco smoke, either produces or aggravates inflammation, and therefore see no reason for its prohibition. If, however,

* [I cannot refrain from here expressing a very decided opinion, that *absolute* silence for several weeks should in all cases be insisted on, and the patient be confined to bed.—Ed.]

cotton yarn to a bent rod,* or the end of a finger of a glove drawn on the finger of the right hand,† which, dripping with the solution should be momentarily pressed upon the glottis; another is to use a smaller sponge and press it through the chink into the larynx;‡ finally the caustic may be finely powdered with loaf-sugar, in the proportion of one to six or eight grains, and then lodged within one extremity of a small and short tube, the patient taking the other in his mouth, and after a perfect expiration, holding his nose, and making a sudden inspiration, whereby the powder will be drawn back and fall upon or through the glottis.§ If at any time any of these applications should seem to have been too strong, the caustic may be decomposed, by throwing after it a solution of muriate or sulphate of soda. The immediate effect of these applications is coughing with increased expectoration, the more remote and permanent the subdual or abatement of the inflammation, and the cicatrization of the ulcers.

The inhalation of various gases and vapors has been employed in this affection.

External applications are not to be neglected in this malady; leeching, when convenient, should be employed, but will do little good if the arterial excitement should be high. Wearing a wet towel round the throat and neck is no insignificant remedy. The water in which it is dipped should not be very cold. Small blisters, so managed as to be followed by a free discharge, do good. Pustulation with tartar emetic ointment or croton oil, kept up for some time, is serviceable. Lastly, a seton has been found useful, but I have not employed it.

Such are the chief hygienic and medicative means which have proved beneficial in simple chronic laryngitis. That they often fail is certain, but in such cases there is generally a lurking tubercular diathesis, of which I shall say something hereafter; or the disease is secondary, and kept up by lesions of the heart or great vessels.

SECTION V.

LARYNGO-TRACHEITIS, CYNANCHE TRACHEALIS, OR CROUP.

I. History, Diagnosis, and Pathology.—Croup in this country prevails most in spring and fall, when, like catarrh, it sometimes approaches to epidemic prevalence. But there is another period in which it frequently occurs. This is the month of June, when in the middle latitudes of the Valley, the early portion of the night has become so hot that the windows of sleeping rooms are thrown open, while the surface of the earth is not yet heated to any great depth, and the radiation of caloric renders the

* Trousseau and Belloc. † Cusack. ‡ Green. § Bell.

from the presence or passage of portions of exuded matter, or of even simple mucus, give rise to a train of symptoms, necessarily all but peculiar to the child, and known by the familiar name in question. Were the man's glottis as small in proportion, he would, *cæteris paribus*, be as often the subject of so-called croup.

The crowing or croupy inspirations in certain forms of hysteria afford an additional illustration of the influence of the relative size of the glottis, or the relative liability of age and sex to the class of morbid phenomena under consideration.]

The first symptoms are often but those of coryza and laryngeal catarrh in its early stages,—a hoarse cough, with a loud but not sharp laryngeal respiration, and but little fever. In this stage it is, on the whole, not difficult to arrest; but in some cases it begins in a less equivocal manner, in others passes rapidly on to a more acute stage. The cough and breathing become sharp and ringing; the vocal cords seem increased in tension, and the rima of the glottis narrowed. At the same time the mechanical part of respiration is performed with increased effort. This change would not of itself, however, establish the existence of laryngitis. A superadded fever is necessary to the completion of the diagnosis, and when that is present, there can no longer be any doubt as to the condition of the patient.

As yet, the tracheal inflammation has not *declared* itself, though it may have existed from the beginning. It *may* even have preceded the laryngeal, though from the analogy of catarrh, as well as from the greater vital endowment and function of the larynx, that organ is probably affected first. With the progress of the disease, often frightfully rapid, the trachea comes to augment the dyspnœa, by sending up, with the inspired air, in breathing and coughing, detached fragments of fibrinous exudation, in the form of imperfect false membrane, which co-operate with those of the larynx in mechanically obstructing the rima of the glottis, and increasing the danger of slow suffocation. Or the trachea itself may be the seat of obstruction, from agglomerations of the same membrane, aided, perhaps, by a certain degree of spasmodic constriction at the same point. Under these circumstances, the movements of the muscles of respiration become more violent and convulsive, from the instinctive efforts of the little patient to introduce air into the lungs.

The inflammation is often limited to the larynx and trachea, but several writers have of late insisted on its frequent extension to the bronchial tubes, and even to the vesicular and areolar structures of the lungs, in the form of bronchitis and pneumonia. The reality of this has been shown, in Europe, by *post-mortem inspections;* but, for the last thirty years, even without the aid of the knife or the stethoscope, many of our own physicians, guided by the symptoms only, had come to the same conclusion. Thus, as far back as 1820, the late Professor Richardson, of Transylvania University, was accustomed to teach his pupils, that inflammation of the

fore more likely to afford a fibrinous exudation. *Third.* In the absence of an exact comparative analysis of the blood in the two stages of life, we may presume, that during the period of growth, that element which is to contribute most to the building up of the organs, will be abundant, and therefore, in inflammation of the trachea the hyperinosis of the blood may be such as greatly to facilitate the exudation of fibrine. Hence we may perhaps understand why in certain cases of croup imperfect false membrane overspreads the pharynx, extending even into the mouth; and why, it is that in the coryza of infants, fibrinous exudation is sometimes mingled with the mucus of the nasal passages.

In the progress of croup the partially detached or floating fragments of membrane as formed in the larynx or trachea become a great cause of danger. But we must also take into view the thickening from congestion of the lips of the glottis, the subjacent serous infiltration, although it may not amount to manifest œdema, and the adherent mucus at the rima glottidis. Still farther we must remember, what slight irritations in childhood are sufficient to excite the muscles into spasmodic contraction; and how much of that dyspnœa, often paroxysmal, attendant on croup, may be attributed to abnormal contraction of the little muscles which move the arytenoid cartilages. Dr. Stokes has referred to this complication of spasm with inflammation, in a manner so pointed, as to indicate that it was doubted by many. In this country, however, it has at all times been recognized, and made the basis of a part of the treatment of that disease.

II. Method of Cure.—In the forming or catarrhal stage of croup, before the development of fever or the change of simple congestion into inflammatory, a tepid bath and an emetic will often put an end to the disease, by perspiration and a free secretion of mucus. When by slow ingravescence or a sudden invasion the disease has taken on the character of a phlegmasia, an active treatment is imperatively demanded. In the beginning of this stage, the physician often finds on his arrival that the child has been immersed in a warm or hot bath, and then wrapped up in blankets, whereby the fever and of course the inflammation have been greatly aggravated. No perspiration can follow this hot regimen, and the physician should never give it his sanction. The treatment in this stage of this disease should be antiphlogistic, and whenever the fever is well developed, the first remedy is bloodletting. In children of a year old the application of two, three or four leeches to the larynx and trachea down to the sternum will be sufficient. In want of these, scarification and small cups may be applied to the nucha and the region of the larynx. If this be not practicable, venesection should be attempted, and from one to two ounces of blood drawn. At a more advanced stage that mode of depletion is preferable to the others, and without reference to quantity, the flow of blood should be continued till perspiration of the face, yawning, or nausea indicates the approach of syncope, beyond which it should never be carried. *Such* a bleeding ought never to be

In more advanced stages but little can be done. The spasmodic action of the glottis may be moderated by an emulsion of assafœtida with laudanum; and to promote the expectoration of the false membrane, a strong infusion of the senega root may be administered. The dyspnœa still continuing, with a haggard expression, and the appearance of a smoky hue of the lips, the question of tracheotomy comes up. The point then to be decided is, whether bronchitis or pneumonia has disorganized the lungs, and thus contributed to the asphyxia which is now going on. If they have not, there is no objection to the operation; but I confess that in this country I have no great reliance upon it as a resource in such an emergency, seeing that parents generally oppose it, and that the greater number of our physicians are not fully prepared for its performance under the difficult circumstances which then exist.

Croup is a relapsing disease, and the danger, always great, is largely from spasm. The chief causes of relapse are, *first*, premature exposure to cold and moisture, or, in any mode, getting the skin chilled; *second*, an inordinate meal, especially of animal food. I once saw a child pass through a severe attack of croup, recover so far as to run about, and sit at the table with its parents, who allowed it to eat a hearty dinner of meat. In a few hours the disease was reproduced, and in as many more it proved fatal.

Many children are *subject* to croup, but they are also subject to catarrh, and not a few of their attacks are of the latter kind only. A diet which excludes meat, is proper in such cases. The cold bath and spending much time in the open air are likewise beneficial. But change of locality from a humid to a drier atmosphere, or from a colder to a warmer climate, may be requisite.

III. Secondary Croup.—This laryngo-tracheal inflammation, like the laryngitis of adults, is often secondary. Thus that form of pharyngitis which has been called diphtherite by Bretonneau, often descends into the larynx and trachea; the same is occasionally true of thrush, and of erysipelas, but and above all of the eruptive fevers. Dr. Stokes has drawn a parallel between the symptoms of primary and secondary croup, in which the most important point is, that the fever accompanying the latter is of a typhous character. This may be correct, as the diseases which are its pathological causes do not possess a high and pure phlogistic character; and as it supervenes on their more advanced stages, bloodletting is then not proper. With the exception of this remedy, and in some cases the substitution of ipecac. or lobelia inflata for tartar emetic, the treatment of secondary must be the same as that of primary croup.

CHAPTER XIII.

LARYNGISMUS STRIDULUS.—PERTUSSIS.—ASTHMA.—HAY-ASTHMA.

We have in this chapter a group of maladies which can scarcely claim admission among the phlegmasiæ, yet there would be perhaps still less propriety

fingers, and the flexion of the feet and toes. The spasm of the glottis may be such as to produce almost immediate suffocation; but more frequently it is prolonged with such diminution of the chink as to generate a bluish tint by slow asphyxia.

In the absence of any ascertained uniform pathological cause for the spasm of the muscles of the glottis in this malady, a variety of suggestions has been made: *first*, that it depends on cerebral irritation, which is in fact but a hypothesis; *second*, that it results from the pressure of enlarged lymphatic ganglia on the pneumogastric nerves, or their recurrent branches, but a disease so paroxysmal could scarcely result from a cause so constant; *third*, that it arises from the pressure of an enlarged thymus gland. The same remark will apply to this. I have met with but one case of that enlargement. It was found in a boy nine years old, who died of purpura hemorrhagica. He had not suffered from this disease; *fourth*, that it is excited by dentition; but it often occurs before that function has commenced. It seems probable that many cases of this malady, in early infancy, are in our classifications mixed up with those forms of abnormal respiration and circulation, which are known under the name of morbus ceruleus.

As bearing on the whole subject we should recollect how easily the muscles of children are thrown into spasm, that their convulsions seldom involve all the muscles of animal life, that they oftener affect those of the face and throat than any others, and that spasmodic croup may perhaps be but an example of infantile and puerile convulsions, limited to the muscles of the larynx and pharynx, and produced by various local irritations.

II. Treatment.—I shall not dwell on the treatment of this malady. A towel dipped in cold water and wrapped round the throat, is one of the best and promptest means of relief; the lady, whose case I have mentioned, has often been promptly relieved by it. Professor Meigs has informed me, that he once found a young man lying in the street, in Philadelphia, nearly asphyxiated from this malady, who was instantly relieved by the same application. Children, its chief subjects, when no catarrhal symptoms are present, may be plunged into cold water, or have it thrown upon them. With the coexistence of catarrhal symptoms, they should be immersed in a tepid bath, and have the cold applications to the throat only. In connection with these measures, tartar emetic, or ipecac., or the wine of either of those medicines, should be administered with laudanum, to the extent of vomiting and incipient narcotism. No other antispasmodic has greater power; and as an indigestible meal is often the exciting cause, the vomiting may prove highly beneficial. Other antispasmodics, as assafœtida, may be useful; and it is in cases of this kind that Dr. Godman found the Scotch-snuff plaster to the tracheal region so beneficial. When the child is in the period of dentition, it will be proper to lance the gums, although there may be no evidence of their being in fault.

SECTION II.

PERTUSSIS OR HOOPING-COUGH.

I. HISTORY.—I shall give no description of this well-known and strom characterized disease. Although introduced here among the simple phl masiæ, it is not, as I have already said, one of them; for even admitti the existence of inflammation as an essential pathological element, wh has been denied, the remote cause is evidently a *specific* aëriform pois This by some is believed to be of local or atmospheric origin, as is that influenza; by a greater number, to be of animal origin, that is, a contagi I cannot settle this controversy, but will confine myself to the mention the following observations. Several years since, a man and his wife fr the interior of the State of Indiana, called on me with a child which labo under ophthalmia. They immediately passed up the river, more than hundred miles, to visit a family in the country. When they arrived, th found the children of the family affected with hooping-cough. After maining about three weeks they returned, and called on me again, whe found that the child had that disease fully developed. Professor Short gi me the following item. There was no pertussis in his neighborhood, wh a mechanic, affected with this disease, was employed by him to do son work within his dwelling. Not long after the work was begun, one of h children, who had never had it, was attacked and died. It would be ea to multiply well-observed facts of this kind, and they seem to indicate co tagious propagation; yet it is possible that the child might only have bee in these cases exposed to a local atmosphere which contained a poison, no secreted by morbid action. This malady is perhaps always prevailing i some part of our Valley, and is by all the people regarded as contagiou The fact of its generally occurring but once, places it with some of the mo certainly contagious exanthems, but when I recollect that yellow fever i general attacks but once, this fact loses some of its value. As to secon attacks, they are rare, for at this moment I recollect but a single well authenticated example. A gentleman who had in infancy come near dying with hooping-cough, experienced a second strongly marked and tedious attack when he was nearly twenty-two years of age, in the summer of 1807, the disease being at that time epidemic; and again, when he was sixty years old, in the winter of 1847–8, he had an attack, the malady being then common, which had all the symptoms, except the hooping. Of course it cannot be affirmed that this *was* pertussis. It was worthy of remark that between his first and second attacks he had often been in close association with those who labored under the disease. I have never seen a sporadic case of hooping-cough, nor, on the other hand, known it to prevail as a wide-spreading epidemic. After sojourning for a while in one neighborhood it enters and prevails in like manner in another.

II. Pertussis is indefinitely self-limited. Many years since it was affirmed that artificial musk would cut it short, but I never saw more than palliation result from it. Afterwards, vaccination in the latter stages of the disease was said to arrest it, but in my own practice it has failed to do so. The prussic acid has been recommended as curative, but Professor Short informs me that on a full and fair trial it did not exercise that power.

Infants may die asphyxiated by this disease from the combined influence of profuse sero-mucous secretion and spasm of the glottis, and the danger is increased by bungling attempts to wipe the tenacious mucus from the mouth, in the latter stage of a fit of coughing, at the moment when after repeated expirations, the air is about to be drawn into the lungs. But a more frequent cause of death is a supervening croup, bronchitis, or pneumonia, generally excited by exposure or a sudden change of weather. In all severe cases, whenever a considerable degree of fever co-exists in any stage, a pulmonary complication should be suspected, especially if the little patient have cough of a common kind between the paroxysms of the specific disease, and during those intermissions the lungs should be carefully examined by auscultation and percussion. Another source of danger and death is cerebral, and appears to result in part from the concussion of the brain by the violent coughing, and in part from an interruption to the passage of the blood from the right to the left side of the heart, whereby it is dammed up in the sinuses of the brain. Under these pathological conditions, cerebral inflammation, either simple or tubercular, may be awakened; but the venous congestion thus produced favors serous effusion into the ventricles. The same effusion has sometimes been observed externally about the face and neck, and was doubtless produced in the same way. The stomach suffers seriously in this disease. So essentially seated in the superior and inferior or recurrent branches of the pneumogastric nerves, which largely supply the stomach, that organ, always ready to suffer with others, can scarcely fail to sympathize with the larynx; but there is another cause for its disordered condition. Much the larger portion of the mucus which should be expectorated is swallowed, and being (as I am convinced) of very difficult digestion, accumulates in the organ, which it irritates into the secretion of acid, often quite obvious when vomiting takes place. This secondary condition of the stomach, as so often happens in pathological conditions, immediately reacts on the suffering larynx, and aggravates the original disease. Although pertussis cannot with any certainty be shortened, it may be prolonged; and when it occurs in autumn, the cold and variable weather is apt to render it protracted. The same cause may even produce relapses, that is, generate catarrhal symptoms with a *hooping* cough, several months after the disease commenced. When no accidental inflammation supervenes, the latter stages of this malady seem to be those of a mere nervous affection; very slight irritations or mental emotions being sufficient to bring on a convulsive paroxysm of cough. Its

lessen the volume of blood, which must of necessity pass through the lungs. The medicines which may be required, will, moreover, act more kindly after such a bleeding. But a repetition will never be required unless some inflammatory complication should spring up; and may do harm by increasing that morbid sensibility, which often gives us so much trouble after the catarrhal symptoms have nearly died away. A more important palliative, though comparatively inefficient if a required bloodletting have been pretermitted, is an emetic. For a young child nothing is more safe and convenient than the wine of ipecacuanha. Older ones may take the powder, which may be advantageously combined with calomel so as to make a subsequent impression on the liver and bowels. Tartarized antimony is not objectionable, and if inflammation should be suspected, should be preferred to ipecacuanha, as more antiphlogistic. It may be given in solution, or in the form of vinum antimonialis, and consulting the prepossessions of parents when the child is very young, the latter should be preferred.* Other emetic medicines, as the squill and lobelia inflata, may be employed, but their effects are less certain, and their management more difficult. As nauseating expectorants they may perhaps be preferable to the medicines just mentioned; and of the two the lobelia should be preferred, as possessing a slight narcotic and antispasmodic property, in connection with its emetic power. I am not however an advocate for the constant exhibition of nauseating doses of any kind of medicine in this malady, except when manifest mucous inflammation exists, but greatly prefer the frequent repetition of vomits, care being taken that they do not produce watery diarrhœa. For reasons connected with the use of opium, the best times to give them are early in the evening and early in the morning. Immediately after the former operation the child should be composed with an appropriate dose of some preparation of opium, to which, every second or third night, two, three, or four grains of calomel should be added. When it is intended to exhibit an emetic in the morning, an opiate of sufficient strength to produce sound sleep should be given at night. This alternation of vomiting and slight narcotism greatly increases the efficacy of both; and keeps down that morbid irritability of the respiratory organs which constitutes so troublesome an element in this disease.

Intimately associated, as are the stomach and larynx by the pneumogastric nerves, we can understand why the condition into which the former is brought by an emetic may affect the latter. Vomiting is in fact an antispasmodic to the muscles of the glottis; and it no less certainly contributes to the dislodgment of mucus from the aerial passages. But its benefits are not limited to these effects. It rids the stomach of the acidulated mucus

* I am by no means convinced that the watery and the vinous solutions of tartarized antimony are quite identical, in the impression they make on the system. The latter, it has appeared to me, is milder, less irritating, and less depressing. When we consider the complex character of wine, we cannot, I think, but admit the possibility of isomeric or other changes in that medicine, which may modify its action.

bleak or rainy they should be taken daily into the open air from the commencement. In the tedious declining stage, such exposure, with travel and change of locality, are often indispensable. If a chronic bronchitis should now exist, a southern climate for winter will be advisable, but otherwise it need not be sought, as cool or cold air is one of the best means of finally subduing the irritability of the nervous system. It is, however, by its action on the respiratory passages and not on the skin that it does good, and therefore the latter should be well protected. Among the remedies for this stage, however, the cold dash is one of the most valuable, care being taken to secure immediate reaction.

SECTION III.

ASTHMA.

I. Dyspnœa, phthisic, or difficult breathing, may result from various anatomical derangements of the thoracic organs, such as aneurisms of the great arteries, swelling of the thymus gland and enlargements of the lymphatic ganglia of the posterior mediastinum. Much oftener do hypertrophies both concentric or excentric, of the heart, give the same result, especially when aided by slight auxiliary causes, such as a wrong posture, a full meal, ascending a staircase, or a gust of passion, which operate apparently by increasing the irregular action of the respiratory apparatus. Empyema, hydrothorax, pneumo-thorax, bronchial dilatation, hepatization, emphysema, œdema, and vesicular dilatation, are causes of habitual dyspnœa, which is liable to aggravation in paroxysmal violence, by whatever can hurry the circulation or respiration, interfere with the passage of air through the bronchi, or disturb the innervation. The whole of these cases of difficult and anxious pulmonary respiration have in past times, by mere symptomatists, been classed together; and, without regard to the anatomical lesions of which they are but the expression, ranged under one head—asthma continued or periodical. To this artificial grouping succeeded the analysis (constituting one of the greatest triumphs of pathological anatomy), which has disclosed to us that dyspnœa may depend on lesions of structure exceedingly variant from each other. One of these has been fixed upon as the proximate cause of that form of disordered respiration, which is generally denominated spasmodic asthma—dry and humoral. I refer to permanent vesicular dilatation of the air-cells of one or many of the pulmonary lobules. But to this hypothesis there are several objections. *First.* That lesion is constant, but the true asthmatic dyspnœa is essentially periodical, and sometimes presents weeks or months of perfect exemption. *Second.* It has never been shown, nor does it appear *how* such dilatation can generate the striking phenomena of a fit of asthma. *Third.* It has frequently happened that after the death of asthmatic patients, no vesicular dilatation

occurs to me at this moment. A man and his wife, each of robust frame, had six or seven children of vigorous constitutions, and one who was seized with asthma—which became permanent while he was yet a young man. In general, asthmatics are not very tall, and have broad chests, with some tendency to fleshiness, if not obesity. Children are more or less subject to this disease, but I suspect that some of these cases are but examples of dyspnœa from congenital formation, or pulmonary lesion following on pertussis. It is in early manhood about the time that phthisis oftenest occurs, that I have most frequently seen asthma begin. This is the dyspeptic period, and the first paroxysms have almost invariably been preceded by an aggravation of that malady. When the dyspeptic era passes away before the fortieth year, or much earlier if the condition of the stomach should improve, the asthma in some cases ceases, but in others it continues through life, which on the whole it does not seem to shorten. The later in life it sets in, the greater is the probability that it has for its predisposing or exciting cause some organic affection.

Of external and material causes, I can say but little, unless we suppose that agents which reproduce the paroxysms may have been the original or producing causes, which would perhaps often be erroneous. The inhalation of certain atmospheric impurities will excite the disease in the predisposed. The sinister influence of powdered ipecac. in certain idiosyncrasies is well known.*

I have not been able to discover that those who work in atmospheres impregnated with mechanical impurities, are particularly liable to this disease, though for a while after entering them they have a considerable degree of dyspnœa. At our salt-works, in our collieries, and in cities where great quantities of coal are consumed, I have been unable to discover any uncommon prevalence of this malady. Of these cities, Pittsburg is the most remarkable, and Dr. Addison informs me that he had seen many cases of the disease originated there; yet Dr. Spear and Dr. Denny stated that they had known many patients signally relieved of it by removing from the country into the city. This, also, I have known in Cincinnati; and the relief was generally greatest when they went into the lowest and least ventilated places. On the other hand, however, the change has sometimes greatly aggravated the disease; and relief has come from seeking a high, dry, and windy locality. In some asthmatics, an impending snow-storm will bring on a paroxysm; in others, the return of a particular season produces the same effect. On the whole, atmospheric influences, appear to be exciting if not producing causes; but their effects are by no means the same in different patients, but often, as we have seen, the very opposite.

* Dr. Richard Allison, Surgeon in Chief of St. Clair's and Wayne's armies, and one of the earliest physicians of Cincinnati, was slightly asthmatic, and could not even weigh out a dose of ipecac. without having a severe paroxysm. Other atmospheric impurities did not have the same effect. Can we admit any connection between this observation and the results of empoisoning by emetics, taken into the stomach or injected into a vein? According to Majendie, the lungs were engorged and inflamed in such experiments.

ciate the two organs in the sufferings of the paroxysm; or give to gastric irritation the power of exciting bronchial and thoracic spasm. I shall pursue these speculations no further, but proceed to say a few words on the treatment.

IV. Palliatives.—As in the case of hooping-cough a very great variety of remedies have been prescribed; and, as in that disease, they have generally accomplished nothing more than imperfect palliation, yet whatever has been done has, if I am not mistaken, been accomplished by means which harmonize with the pathological views which have just been taken. In the earlier stages of the disease, I have frequently seen an emetic arrest the forming paroxysm; and in the more advanced, it often affords great relief. Mercurials, either the blue pill or calomel, to act on the liver, are necessary, but free or hydragogue purging is not advisable. Bloodletting is sometimes demanded in a full habit and before the disease is far advanced, but it never puts an end to the paroxysm, and may even prolong it. Nauseating doses of ipecac., given with an equal quantity of calomel, or mingled in draughts of lobelia infusion, are useful. I cannot agree with Dr. Bree and Dr. Mackintosh, that opium should be avoided; on the contrary, it may be advantageously combined with the medicines which have been mentioned, or with tartarized antimony in sub-nauseating portions. Equal parts of wine of ipecac. and paregoric often give relief. The acetate of morphia dissolved in spiritus Mindereri is equally useful. Another available antispasmodic is the tinctures of assafœtida and opium combined; another, the tincture of lobelia, with paregoric, or the tincture of hyoscyamus. It is necessary to invent many formulæ; for in this, as in the acknowledged neuroses of the hysterical stamp, the nervous system soon loses its impressibility to one preparation. What gave relief yesterday will fail to day, while a new formula will succeed. As to the tincture of lobelia, I have been in the habit of employing it for more than thirty years; not merely in the paroxysms, but between them, as a means of diminishing their frequency and violence; and although it has often failed of any appreciable effect, it has, on the whole, done more good than any other medicine I have tried. Rubefacient or narcotic frictions over the spine sometimes give relief, and when the sense of vesicular suffocation is very great, a large blister should be applied to the anterior part of the chest. Now that an empiricism has broken down the popular prejudice against the use of water, I should not hesitate, in a case unaccompanied by organic lesions, to wrap the thorax in towels dipped in cold water, well knowing its power in controlling spasmodic action. As to the inhalation of the smoke of stramonium leaves and other narcotics, I can say nothing conclusive from my own experience.

The treatment between the paroxysms should be hygienic and corroborant. It is especially necessary to attend to the digestive organs, and to avoid all known exciting causes, while everything which can increase the vigor of the system will be proper. I have no room for details, and will only add, that

however, as usual, and did not seem modified in character by the malarial disease. After residing there three years, and finding his malady not arrested by the warm climate, he left for Cincinnati, where he has resided eight years. The attacks here commence gradually about the middle of September, and continue from two to four weeks, with less violence than they had in Massachusetts.

III. SYMPTOMS.—The paroxysm invariably commences with itching in the nostrils, and a sense of fulness, as if the nares were plugged up with polypi; sneezing, and a constant dripping of transparent acrid fluid immediately supervene, the mucus, after several days, becoming thicker and opaque. Very soon a troublesome itching, with a little aversion to light, begins in his eyes, which show more or less of sanguineous congestion, but without uniformly increased mucous or lachrymal secretion, for the conjunctivæ feel dry. The discharge from the nostrils is diminished through the night, and has irregular periods of remission and exacerbation in the day. These symptoms constitute, as it were, the first stage of the attack. They are ushered in without any precursory indisposition, loss of appetite, or attendant chill and fever.

In eight or ten days, the coryza ceases, or greatly abates, and is replaced by the pulmonary or bronchial affection. This begins with dyspnœa and a sense of oppression or tightness in the *upper* part of the chest, attended with a dry, hoarse cough, which was more severe in Massachusetts than it is in Ohio, but is unaccompanied with pain or fever. Sometimes he expectorates a little mucus; but never has the profuse bronchial secretion so characteristic of humoral asthma. The dyspnœa is often so great as to compel him to sit up all night, feeling, at the same time, in other respects quite well.

This gentleman first called on me in July of the present year, 1851, when I collected from him the foregoing history. He was then free from the disease. His frame was rather slender, his chest not capacious, but well formed, his flesh moderate, his hair black, and his complexion somewhat muddy and sub-sallow. His pulse was sixty, and his breathing eighteen, in a minute. Under a careful examination by percussion and auscultation, I could detect no abnormal sounds either in the lungs or heart. Three weeks afterwards he called again, in the fifth day of his annual attack of coryza. The symptoms were those which have been given. The bronchial had not yet come on. His pharynx and palatal arches exhibited a little redness. His tongue was healthy. He had no fever. Soon after this he started for Massachusetts, and thence went to North Carolina, being gone three weeks, and thus depriving me of the opportunity of inspecting his chest during the bronchial stage of the disease. It was not quite over, however, when he returned, and I found the bronchial sounds in the upper part of his lungs louder than when I examined him before. They were dry. His attack had been worse than usual, which he ascribed to the dust of the railway,

stantly present. Pains of an obtuse and deep-seated character are soon felt in various parts of the chest at the same time, but not long in one place. They frequently attack also the muscles of respiration, which are easily excited to action, and hence a full or rapid inspiration always brings on cough. At the beginning of a sudden invasion there is little or no expectoration; but generally within twenty-four hours mucus is thrown up. At first it is little altered, but soon loses its transparency, and in all violent cases presents streaks of blood. With the progress of the disease, and especially in the declining stages, it is sometimes profuse. When the attack is protracted, pus becomes blended with the mucus; but this belongs more properly to the chronic form. The patient commonly lies as well on one side as the other, but prefers to have his head and shoulders raised.

The symptoms which have been enumerated leave no doubt as to the existence of acute bronchitis; yet recourse may be had to the physical signs. Under percussion the resonance of the chest is nearly or quite normal. Auscultation, however, reveals in the beginning sibilant and mucous râles, more or less mixed up; but subsequently a great predominance of the latter. The vesicular murmur is often unheard in consequence of the loud sounds formed in the bronchial tubes. It can best be heard near the base of the lung. This method of examination, although not necessary to a knowledge that bronchitis exists, is of importance, indeed, is the only reliable means for ascertaining its extent. Thus, by travelling over the chest, we decide as to the presence or absence of bronchial inflammation in the different parts of the lungs. Another important use of the stethoscope is to inform us whether the inflammation is passing from the tubes into the surrounding areolar tissue, or into the air vesicles, thus adding pneumonia, with its crepitant rattle, to the previous inflammation; last, when, as sometimes happens, a bronchial tube becomes so plugged up that no air can pass along it, the condition is detected by the absence of sound from that part of the lung while it still retains its resonance.

In coming to a favorable termination, the pulse becomes slower, and more equable, the fever abates, the thoracic stricture is relaxed, the expectoration becomes profuse, the skin moistens, and the patient inclines to sleep. On the other hand, when it goes on to an early fatal termination, the pulse loses its volume, increases in frequency, and becomes struggling and irregular, the dyspnœa becomes anxious and distressing, the cough often fails to effect expectoration, and the mucous râle increases, while the chest, from the filling up of the bronchial tubes and their terminal vesicles, and also from increase of congestion, loses a portion of its resonance; the patient requires to be propped up in bed, and from defective aeration of the blood, his lips, nails, and other parts of the surface display a dusky or smoky hue. With these symptoms he dies by slow asphyxia, aided by the sympathetic influence which the lesion of any great organ exercises on all the rest, through the medium of the nervous system.

II. Lesions.—The essential characteristic lesion of acute bronchitis hyperæmia, with thickening and softening of the affected membrane. T tubes abound in mucus, which the patient, for a time before death, unable to expectorate. In some places there are patches of unadhe coagulating lymph. A purulent secretion is generally mingled with mucus, the pus being secreted by the inflamed membrane. A partial pn monia around the tubes may leave the characteristic lesions of that disea and when the air-cells have been invaded, the lesions of pneumonia are fo there also. The part of the lung in which these latter lesions exist s sink or swim in water, according to the amount of unsolidified tissue ta off with them. From the carbonized state of the blood, all the tissues more or less deepened in color.

III. Cure.—The first blood drawn in this disease is not always bu Several bleedings are occasionally necessary, yet a second is freque sufficient. On the whole less venesection is required or borne than in pn monia and pleurisy. Aged and infirm persons, in whom the congestion m be largely uninflammatory, pneumonia notha, will sometimes not bea single bleeding. From the difficulty of bleeding little children, bronchi often destroys them. One bleeding, however, is in general sufficient, carried to impending syncope. Afterwards the case may be trusted to an phlogistic alterants, which without the loss of blood would have produc but little effect. Cupping is a common remedy, but from the manner which the mucous membrane is insulated from the parietes of the chest, may doubt whether it can produce much salutary revulsion. A large bliste acting through the nervous system, promises more, and after adequate ven section often gives great relief to the dyspnœa.

In the early stage, an active emeto-cathartic, of calomel, jalap, and ta tarized antimony, or powders of the first and last with nitrate of potasl are followed with happy effects. It is important to carry off the existin contents of the stomach, bowels, and liver, and to make diversion from th lungs. In the beginning alvine evacuation will not interfere with that ex pectoration which is the natural cure of the disease; and subsequently th regular action of the liver, and a soluble state of the bowels, are all tha should be aimed at in the use of aperients.

The great medicines in this disease are the nauseants and the unstimula ting expectorants. The most important of the whole is tartarized anti mony, as being sedative, alterant, and promotive of bronchial secretion. I may be given alone, or combined with tincture of digitalis or lobelia. have generally used the former, and found it a valuable adjuvant to tarta in subduing this inflammation. It should be continued till the pulse feel its peculiar enfeebling influence, and then as its effects are cumulative an somewhat enduring, should be laid aside, lest the powers of the heart migh be too much depressed. Ten drops with an eighth of a grain of tartar, i mucilage every two hours, may be regarded as a medium dose. But calo

mel should not be overlooked in this inflammation, and it may be advantageously combined with squills, two grains of each in a pill, being given every two hours, or every four hours, alternately with the other compound. The four medicines here advised, I have found more valuable than all others. Their effects will be augmented by the use of warm mucilaginous or acidulated drinks. During their administration the patient may occasionally vomit. To this there is no objection; and indeed whenever the bronchiæ are much clogged with mucus, vomiting will be one of the most certain means of relief.

At a certain stage, more or less early according to the temperament of the patient and the degree of bloodletting premised, we may begin the combination of opium with these medicines. It is required to allay irritability, appease the cough, procure sleep, and determine the action of the nauseants upon the skin. Thus managed, *expectoration* may be temporarily suspended, but the *secretion* of mucus, and consequent resolution of the inflammation, will not, for moisture of the skin is highly favorable to bronchial secretion.

Such is the method which I have long found successful in acute bronchitis; but there is a stage or state of the disease which requires other remedies. When the powers of the system have begun to fail and the expectoration is not free, the transmitting function of the lungs also fails, and they become doubly engorged with mucus and blood. With a weaker pulse, the patient feels increasing dyspnœa, and becomes anxious and restless. His tongue at the same time has lost its white color, and his mouth as well as his skin becomes dry. We must not confound this condition with that produced by an unsubdued and disorganizing inflammation leading to great depression and a livid or smoky hue from the state of the blood, and which is in general fatal.

The former condition is not necessarily so, and should be met by stimulants, especially those which experience has taught us act somewhat specifically on the lungs—the stimulating expectorants. Every physician will form his own compound in this emergency. I will mention those which I have found most efficacious. Boluses of carbonate of ammonia and camphor made up with balsam copaiva; a tinctus of oil of turpentine, loaf sugar, and gum Arabic; lac ammoniac and carbonate of ammonia; lastly, an infusion of seneka root with tincture of assafœtida. To each and all of these compounds Dovers' powder or some other preparation of opium should be added. The inhalation of aqueous vapor or that of vinegar is also useful in this condition. If the feet should fail in temperature, they should be placed in a stimulating bath; and sinapisms to the epigastrium or chest are often beneficial. This pathological condition is, except in highly lymphatic temperaments, of transient duration, and as the patient emerges from it, the treatment recommended for it should be gradually laid aside. As to the other pathological state which shows the blue complexion, I know of no better treatment than that which has been laid down, though a successful result should not be anticipated.

regimen are now, however, of much moment. Exposure to a cold, moist, or changeable air, sitting in the wind, or sleeping in damp apartments, must be carefully avoided; and the feet especially should be kept warm and dry. Tepid bathing, with frictions over the chest to make revulsion to the surface and maintain the functions of the skin, are useful. The diet should be restricted, unirritating, and liquid, meat and condiments being excluded, and milk or buttermilk made a portion of every meal. All active exercise, lifting, and loud speaking should be prohibited. Finally, every kind of impure or confined air which might make a sinister impress on the inflamed membrane should be avoided. By carefully observing these regulations, the disease will often be subdued with very little or without any medicine, while to disregard them is to nullify the effect of all medication.

The lancet is not so often employed in this disease as it should be. The heat of the skin which so frequently guides us in the diagnosis of fever, is often absent in this malady, when the firmness of pulse and the inefficacy of our medicines indicate such a phlogistic diathesis as calls for venesection. Even in the winter bronchitis of the aged a copious bleeding is frequently of very great advantage. The blood will be sizy, although no increase of heat suggested fever. When pain seems fixed in any particular part of the chest, cupping with scarification will be proper; and extensive dry cupping may do something, perhaps, towards revulsion.

No remedies are more constantly resorted to in this disease than counter-irritants. I have not found them so beneficial as they seem to have been in the hands of others. When there is fixed pain or a general feeling of stricture, a blister may do good; but its incessant repetition is of doubtful propriety. Adhesive plasters sprinkled with tartar emetic, often lead to deep and painful ulcers, for which I have never seen any compensating benefit. An *extensive* application of tartar ointment continued so as to maintain for a while a slight but widespread pustulation, is I think, the best mode of counter-irritation.

The stomach, probably from sympathy with the lungs or liver, is frequently deranged in its function; but the liver, I think, still oftener. This, it is possible, may arise from the obstructed passage of blood through the lungs, whereby the ascending cava, overcome as it were by the descending, is not able to discharge its blood in due time, and thus the liver may become engorged. In this condition, the secretion of bile is sometimes morbidly increased; at other times suspended; while both conditions disturb the functions of the stomach. For the first, simple purgation is all that is required; for the second, such means as will revive the secretion, should be employed. Of these, the best is a pill composed of one grain of calomel and five of extract of taraxacum, given every four, six, eight, or twelve hours, according to the exigency of the case. By taking the last term so as to give two grains of calomel in the twenty-four hours, a slight constitutional effect may at length be produced with advantage to the lungs. As an external remedy in these cases the nitro-muriatic solution applied

chitis. This piece of diagnosis may be made perplexing, by seeking for what does not exist, if we look for a *sudden* change of symptoms, indicating an equally sudden pathological change. But if we bring the phenomena of the early stage of chronic bronchitis and those of the latter stage of bronchial consumption together, and, after contrasting them, imagine a progressive conversion of the antecedent into the subsequent, we shall relieve ourselves of much embarrassment. Bronchial consumption is, in fact, but the well-developed suppurative stage of chronic bronchitis, and bearing the same pathological semeiological relation to it, that the purulent secretion, hectic fever, and emaciation connected with a large cellular abscess bears to the inflammation and phlogistic fever which produced it. Now in this latter case, as the first fever declines with the secretion of pus, the second begins to arise; or, after the lapse of a little time, sets in. At the beginning it is slight, but gradually increasing, it comes at length into full development; and such is the course of events in suppuration of the bronchial membrane.

II. In the preceding section I said nothing of the lesions of chronic bronchitis, reserving them for this place. They consist essentially of hyperæmia, thickening, softening, and incipient ulceration, with more or less extension of inflammation through the tubes, and consequent disorganization or hepatization of the areolar tissue around them, and of a similar implication of the vesicles of some of the lobules. At the same time, even when no ulcerative absorption has taken place, pus is found intermingled with the abounding mucus. Now, in bronchial consumption we have all these lesions in an aggravated degree, especially the ulceration, with superadded hypertrophic dilatation of one or many bronchial tubes; and very often an obliteration of the cells in which the dilated tube has its termination. This obliteration may be consequent on an obstruction or obliteration of the tube below the dilatation, or the cells may be first obliterated, and the tube then dilated from the air being prevented from passing through it to the lobules. In either case the latter become atrophied, and not supporting the cells of the surrounding lobules, they may be ruptured in deep inspiration, and a portion of air may escape into the areolar tissue, adding emphysema to the previous lesions. I have said that the pulmonary tissue round an inflamed tube is apt to participate in the disease and become hepatized; but the inflammation abating in violence as it does with the progress of suppuration, the surrounding hepatized areolar tissue may undergo a change, and by absorption be brought into a state of atrophy, being reduced to a mere cellulo-fibrous structure, a condition which may increase the dilatation, by leaving the tubes unsupported.

III. The diagnosis of bronchial consumption, after what has been said, may be thus summed up: Hectic fever; purulent, or muco-purulent expectoration, often exceedingly copious; bronchophony simulating pectoriloquy in the dilated tubes; with considerable emaciation. Of course dyspnœa, wandering pains, occasional stricture, cough under a deep inspiration,

Of all remedies, the most important in this as in laryngeal phthisis, is a southern climate. The patient should, if possible, get out of the region of catarrh, and bathe for six or seven months of the year in a warm and more genial atmosphere. The further he lives north in our Valley, the earlier in autumn should he leave home, the later return in spring. When our woods have put on their autumnal hues, and no frost has yet been sharp enough to freeze off their dying leaves, the invalid should be off; and not return in spring till the same woods are clothed in green. But, like a bird of passage, both his going and returning should be gradual. He should just keep ahead of the cold weather of autumn, and the *hot* weather of spring. To go with rapid speed from a high to a low latitude, is not salutary, and to ascend suddenly from a region of great heat to one much cooler is still worse. A neglect of these various rules has rendered many a trip abortive of all benefits; or even made it worse than remaining at home. Thus, it frequently happens that patients, on their way to the South, are retarded or arrested by the ice, while descending the Missouri, the Upper Mississippi, or the Ohio; this is a dangerous exposure, and to have remained at home till the winter sets in, for such ice is never generated till December is considerably advanced, is a mischievous absurdity. Then in March, to be deluded by the heat and full vegetation around them, and, with steamboat speed, return through ten or fifteen degrees of latitude, to encounter the cold rains, northern winds and frosts, where the heat has not yet been great enough to unfold the forest leaves, is to give to those atmospheric conditions, an influence much more pernicious than if the patient had wintered at home. As to sojourning far in the South throughout the summer, it is not to be commended. The patient goes there not so much for the curative effects of high temperature, as to escape the aggravating influences of a cold and variable atmosphere; and if he should continue there throughout the summer, he might be greatly enfeebled. Cool and fresh air is necessary to sustain him under the suppurative diathesis, and he may even, with much advantage, spend the summer months in a higher latitude, as at Mackinac, at Fort Snelling, or on the banks of the St. Lawrence; indeed, from the sources of the Mississippi down to Quebec, places of summer sojourn and travel are numerous and available.* But let us return to the South, and inquire into our resources for winter accommodation. I am sorry to say that they are not very good. The winters of New Orleans, Mobile, and Pensacola are wet, and spells of weather quite too cool for pulmonary patients are perpetually occurring. Galveston, a little further south, is too limited for exercise, is subject to the "northers" from the *Sierra Madre*, and, although an island, is too near the continent to present the equability of a true insular climate. Tampico and Vera Cruz enjoy a more appropriate climate, but are deficient in accommodations. Tampa Bay and Fort King have climates more favorable than those of the

* See Book I.

one of tincture of digitalis, in the dose of thirty drops three or four times in the twenty-four hours, is often beneficial, seeming to act as a tonic to the bronchial tubes. Myrrh is also useful, and as chalybeates are not only admissible but beneficial, the *mistura ferri composita* finds here, perhaps, its most appropriate place. The syrup of iodide of iron is also well adapted to this disease. Our wild cherry (*Prunus Virginiana*) is another medicine deserving of considerable confidence. A cold infusion of the bark, *by displacement*, is the best preparation, as on the hydrocyanic acid, which it then contains, a part of its good effects depends. If, however, a scruple of the finely powdered bark should be mingled with each dose of the infusion, its tonic properties will be much increased. A more reliable tonic still is the cinchona bark, which may be given in ale or porter, or made into a decoction and acidulated with elixir vitriol, a prescription which is thought, and, perhaps, not without some foundation, to diminish the morning sweats. They are more or less mitigated by the avoidance of tartar emetic, ipecac., and other expectorants which act as sudorifics; but a more positive mode of abating them is to make a strong revulsion upon the kidneys by stimulating diuretics, such as balsam copaiva, oil of turpentine, oil of juniper, and spirit of nitrous ether. An emulsion of copaiva with the spirit of nitre, although offensive to the taste, is one of our best compounds. In furtherance of the same object, the patient may take occasional draughts of gin and water, or black tea, which to many persons in health is so great a diuretic that they have to refrain from its use. The state of the liver and bowels should receive attention in every stage of this malady, and the means recommended in the preceding section be employed when deemed necessary. Finally, opium is required throughout the whole course of treatment, and the solid drug is, I think, preferable to any of the preparations of or from it. It acts on the skin less than paregoric or the salts of morphine, and is more gradual and permanent in its effects than laudanum. It promotes absorption and diminishes the secretion in the bronchial membrane, but does not, as far as my own experience instructs me, diminish the action of diuretics; it suspends or appeases the cough, diminishes the irritability of the heart, and the frequency, while it increases the fulness of the pulse, and being administered in the form of half grain or grain pills, at regular periods, it even seems to co-operate with the tonics in maintaining or restoring the vigor of the patient, an indispensable step in the arrest of this as of other extensive suppurations with the hectic diathesis.

pneumonia. The acute pain in the side, with cough and fever, determines the diagnosis, and the associated pneumonia remains undetected. Some time since I was consulted by a gentleman from the country, who told me he had gone through an attack of *pleurisy*, but on submitting him to auscultation and percussion, I found more than half his right lung in a state of hepatization.

II. Pleuro-pneumonia may occur sporadically in every season of the year. According to our Army returns,* it prevails most in the first quarter, January, February, and March, and least in the third quarter, July, August, and September; the numbers being 31·7 cases in 1000 men, for the former, and only 7·4, for the latter. The second quarter presents 14, and the fourth 17·2. Thus if we add the first and fourth together, so as to include with the winter months the first spring and last two fall months, we have for the cold half of the year 49, for the warm half 21, or considerably less than half the number. I have monthly returns for three years from Dr. Ames, which give for the first quarter four times as many cases as for the second, six and a half times as many as for the third, and eight times as many as for the fourth. These statistics disclose that the pneumonic diathesis is generated by cold weather, and runs into warm, giving a much larger number of cases from the winter to the summer solstice, than from the latter to the former; in connection with which, it is worthy of being recollected that measles, although produced by a specific poison, prevails oftenest and most extensively in the same half of the year.

III. Pneumonia occurs in every period of life from infancy to old age. It is, I think, most rapidly fatal in the two extremes of life. In the former period it is much more limited, often lobular, than in the latter, and at the same time more acute; for in the aged it often presents the character of extensive sanguineous engorgement, without the symptoms or ravages of acute inflammation. This is, perhaps, the pneumonia notha of the older writers. My own observations coincide with those made in other countries, in showing this malady to be more frequent in men than in women, perhaps from their greater liability to the acute phlegmasiæ generally, and from their greater exposure to the well-known principal cause of the malady. For the same reason it is, I think, more frequent among the people of the country than the city, certainly among the laboring and exposed classes than any others.

As pleuro-pneumonia may occur in every part of our Valley from the latitude of 48° down to 24°, as it is often engrafted on our typhous fevers, and quite as often complicated with a malarial diathesis, it follows that we should regard it as one of our most momentous diseases. What has just been said, suggests that we view it under three pathological and semeiological aspects; *first*, as a simple phlegmasia, in which the phlogistic diathesis is unmodified; *second*, as connected with a typhous diathesis or fever, typhoid pneumonia;

* See Table p. 790.

admixture of the coloring matter of the blood, which gives it a prune-juice, brick-dust, or ochrey appearance; the tongue shows the erect white fur of the phlegmasiæ, and headache supervenes; but the stomach and bowels are not in general disturbed. In this state the pulse may be various in character. The cases are not a few in which (until after bloodletting) it continues small and somewhat interrupted or hesitating, though preternaturally frequent; but otherwise (and almost invariably after the first or second bleeding), it becomes full and tense. When this does not happen, the inflammatory congestion is of such extent as seriously to impair the *transmitting* function of the lung; and the danger is correspondingly great.

The symptoms now continue, with no other modification than that of increased intensity. If severe from the beginning, the attack may run on to a fatal termination in five or seven days; but in milder cases the termination in death will take place after the first or even second week. Advancing to such an issue, the pulse loses its force and fulness, but increases in frequency and unsteadiness; the sputa become more tenacious, and instead of increasing, often diminish in quantity; the breathing becomes shorter and more rapid; the difficulty of expanding the lungs augments; the patient feels a necessity of having his head and shoulders raised, and asks for a free supply of fresh and cool air; his countenance evinces extreme anxiety; his face is sometimes pallid, but oftener dingy; and his lips and nails assume the livid or smoky hue, indicative of defective aeration of the blood. It is unnecessary to follow these signs of impending dissolution any further; and I turn back to speak of a symptom which has been passed over. It is well known that fever from any cause whatever, will in some persons produce delirium. This is a frequent occurrence in pneumonia, and has been ascribed to the state of the blood, of which I have just spoken. It is, however, more properly ascribed to the intensity of the fever, or to sympathy of the brain with the lungs, for it occurs long before the exhibition of unequivocal signs of carbonated blood may arise, in mere lobar or limited inflammation, if the fever be intense; and, finally, there is no evidence that defectively aerated blood produces the active delirium so often present in this malady. That state of the blood may, however, modify the delirium by superinducing coma, and to it we may ascribe the benumbed and drowsy condition of the patient so portentous in the latter stages of this malady.

Thus strongly marked in its symptomatic history, I cannot see how any one can be mistaken in the diagnosis of pneumonia, any more than of hepatitis or gastritis. Pathological anatomy has demonstrated that when these symptoms are present, the parenchyma of the lung is inflamed; and it is by their guidance alone that an immense majority of *our* physicians are conducted to the conclusion on which their practice rests.

II. Physical Signs. — Notwithstanding the sufficiency of the symptoms for a correct diagnosis in ordinary and well-developed cases, we are by no means to neglect or undervalue the signs afforded by auscultation

the zero of hollow sound, the resonance increases in all directions, for the obstruction to the admission of air diminishes; and entirely beyond the inflamed part, the sound may even be unnaturally loud from abnormal distension of the air-cells, to make up for the obliteration of those which are inflamed. The return of resonance, always gradually of course, indicates resolution of the inflammation, and presages recovery. But this restoration follows on rather than proceeds, *pari passu*, with the abatement of the inflammation, which never fails to manifest itself by abatement in the urgent symptoms. It may even be some time before those organic changes have occurred, by vascular contraction, interstitial absorption, and bronchial secretion, that will render the inflamed part re-permeable by the air; and in some cases they never occur. Thus, it is not uncommon to see individuals who have recovered from pneumonia,—but of course remaining infirm—have obtuseness or flatness of sound for several months after the attack; and I know a gentleman at this time whose side has continued in that condition for more than three years. In the spring and summer of 1843, when travelling in the southern part of the Valley, after pneumonia, especially among the blacks, had been unusually prevalent in the latter part of winter, I saw many going about with a large portion of one lung so hepatized as to give out a perfectly flat sound on percussion.

In the beginning of pneumonia, when there is nothing but sanguineous engorgement of the lung, producing doubtless a certain degree of compression of the smaller bronchial tubes and the air-cells, but not destroying their permeability, little reduction of resonance, as we have seen, exists, and auscultation still discloses the natural murmur; but when inflammation or active hyperæmia supervenes, dulness of sound begins. This implies diminution of permeability, and is the effect of secretion into those extremities of the respiratory tube. At first the secretion is unadhesive mucus, often streaked with blood, and when the stethoscope is applied, more or less of bronchial rhonchus is heard.

Of course, but little is known of the anatomy of the lung in this stage of the disease, but from analogy, and from the appearance of the congested parts around the seat of inflammation when, at a more advanced stage, it has proved fatal, we may infer that if examined it would show great engorgement of blood, with frothy mucus and serum, which might be squeezed and washed out; that it would crepitate on pressure; swim in water, and when deprived as far as possible of blood, could be inflated. In short its structure would be unimpaired.

But the exudation of lymph mingled with the mucus speedily commences, and is but slowly expectorated. The admission of air is now more limited, and the dulness of course increases. At the same time the passage of air through the minute tubes leading to the vesicles and its entrance into them, generates a new sound, which gradually replaces the respiratory murmur. This has been ascribed to two causes, the secretion of the sides of the tubes,

signal abatement of the symptoms of inflammatory orgasm actually precedes the favorable change in the physical signs.

No inflammation reaches the stage to which we have followed pneumonia without the secretion of pus; which, of course, begins in the central or focal point, but lymphization does not cease as suppuration comes on—it only abates. Neither the physical signs nor the symptoms inform us that suppuration is going on. The mere lapse of time, should the case prove fatal, would justify the anticipation of finding pus after death. When sputa through the different stages of the inflammation shall be examined by the microscope, pus corpuscles will doubtless be detected, for the smaller bronchial tubes are likely to secrete that fluid. The expectoration may now become more copious, as the pus may contribute to the detachment and softening of the adhesive contents of the air vesicles, and with this will arise a mucous or even gurgling rhonchus. To what extent suppuration of the lung may take place, and still the patient recover, is not known.* In general, the pus is diffused, as in the case of phlegmonous erysipelas of the extremities. This must not be ascribed to a want of the coagulating lymph necessary to the construction of restraining walls, but to the open or areolar structure into which it is poured out. In the compact texture of the liver such diffusion cannot take place, and it accumulates into an abscess. Such an accumulation in the lungs is rare. My own limited experience coincides with that of the great pathologists. I have seen but a single case after death. It was in the middle lobe of the right lung, and confined by the union of the pleura of the organ to that of the side. Professor Gross has seen but one case, save that of many small lobular abscesses in the lung of a child.* Yet I have had several apparent instances of vomica, some of which were cured. The symptoms of pneumonia, not pleurisy, preceded the copious purulent expectoration. One case was remarkable in this, that with the symptoms of pneumonia, there was no pain in the chest, but below the cartilages and diaphragm on the left side, in the splenic region. The patient had not labored under any previous disease of the spleen. Great dyspnœa and intolerance of recumbency existed for some time before the sudden expectoration of a large quantity of pus, under which the patient sunk. The absence of pleuritic symptoms pointed to pneumonia. No post-mortem inspection was permitted. This case and most of those I have seen followed on the great influenza of 1807, a disease more likely to excite or predispose to pneumonia than pleurisy. In the diagnosis of such cases, the physical signs, not then understood in this country, would have been of much value.

III. The differential diagnosis and complications of pneumonia deserve attention. It may be distinguished from bronchitis by the fixed position of the pain; by the occurrence of rust-colored sputa instead of transparent mucus streaked with blood; by the later coming on of expectoration; the

* El. Path. Anat. p. 435.

first, the intensity of the phlogistic diathesis; *second*, the extent of the inflammation, especially its existence in both lungs; *third*, its approach to the apex of the lung or the base of the heart. The first of these may be determined by the general symptoms, the last two by the physical signs. Before commencing the treatment we must recollect what I have not yet mentioned, that in the aged, infirm, or leucophlegmatic, the lung may be deeply engorged, with but little development of inflammatory orgasm; and such cases must, in general points of treatment, be excepted from the therapeutic rules applicable to acute inflammation. They constitute a part, at least, of what the older writers called peripneumonia notha. Having eliminated these, we have to combat a simple, acute idiopathic phlegmasia, the means of doing which I proceed to consider *seriatim*.

II. Bloodletting.—We may deduce the necessity for copious bloodletting in this disease from several premises. *First*. The tone of inflammatory action, as indicated by the symptoms and the remarkable hyperinosis of the drawn blood. *Second*. The necessity that all the blood of the body should pass through the lungs in a given time. If the left ventricle in health throw out two ounces at each contraction and repeat it every second, twenty-two pounds and a half, a quantity equal perhaps to the whole, must pass through the lungs every three minutes. But if the contractions be one hundred in a minute, and the heart should then throw out but an ounce and a half at once, the whole quantity will be required to pass from the right to the left side in less than two minutes and a half, a portion of the transmitting tubes being at the same time incapable of performing their functions; the difficulties under which this may place the right side of the heart and its venous system cannot be misconceived. *Third*. The vena azygos, which returns the blood carried into the lungs by the bronchial or nutrient arteries, opens so near the right side of the heart, that this accumulation of blood cannot fail to retard the discharge from that vein, and still further to increase the engorgement of the inflamed organ; while the exit of the blood of the heart by the coronary veins is equally retarded, producing in the parietes of that organ a congestion which, with the continued restriction of the right auricle and ventricle, may perhaps in part explain some of its anomalous movements in pneumonia, and especially its liberated action after free bloodletting. *Fourth*. The proximity of the engorged and inflamed capillaries to the heart, which is closer than that of any other portion of the vascular system except the coronary arteries. Thus it happens that when the capillaries which connect the pulmonary artery with the pulmonary veins are the seat of obstruction and hyperæmia, with the active morbid function of inflammation, the violent *vis à tergo* of the blood from the right ventricle through the short pulmonary artery, cannot fail to cause a rapid augmentation of the inflammation. *Fifth*. The readiness with which the lungs undergo lesions of structure. This results from the absence of a compact parenchyma, like that of the liver or kidney.

ed of two classes of vessels carrying blood into them, and two classes
; blood out of them, of a system of tubes carrying the atmosphere
and outward, and a system of cellules which receive, retain, and
out, the whole connected with areolar tissue so loose and elastic as
of great expansion and contraction, *free surface* is the great
al characteristic of this organ. Surface is present everywhere—
enchyma nowhere.* Such a structure may rapidly destroy itself
roducts of inflammation. *Sixth*. The fatal effects of this disor-
upon the whole system, through the interrupted aeration of the
u its effects on the nervous system.
ger reasons than these cannot be found in the inflammation of any
rgan, for the early and [illegible] raction of blood.
forming stage of som ions it may not be proper to bleed,
rring, as we have done to the po tion of the lungs, in the highway
whole circulation; seeing, inde that, for a certain distance, they
e that way, we cannot doubt ropriety of immediately lessening
ntity of blood to be transmitted long it, when we find any portion
bstructed; and hence, venesection is proper even before the develop-
ment of inflammatory orgasm in the s s, or a state of hyperinosis in the
blood. As I have already said, the od drawn in this stage generally
shows no buff, yet the thoracic weight l constriction are abated by it, and
the medicines which may be administer produce more decided effects than
when they are given *ante venesectionem*. After such a bleeding the heart gene-
rally acts with greater force and frequency; and the second, or, at most, the
third, bleeding shows an abounding hyperinosis. Thus, although bloodlet-
ting will not, as a matter of course, prevent the development of inflamma-
tion; it must contribute to its limitation in extent and intensity, and con-
sequently to the preservation of the lungs from disorganization.

But the physician, in general, is not consulted till actual inflammation has been developed, when the first-drawn blood is found buffy: yet the second-drawn, is generally more so, and the third, in many cases more buffy still. This, however, should not be regarded as conclusive evidence of increasing inflammation (though such may be the fact), but of a rapid diminution of the red corpuscles, giving a greater *comparative* quantity of fibrine. And this explanation suggests that we are not to continue the repetition of bloodletting as long as the buffy coat appears, for in doing so, we may impoverish the blood, and generate constitutional irritation. From the direct hydraulic power of the right side of the heart, exerted through the pulmonary artery, and of the left side, through the bronchial arteries, over the lungs, it is necessary (always safe) to carry our first and second bleedings so far as to enfeeble that organ, and by reducing its mechanical force to save the lungs from the injection to which they are exposed. The first abstraction should produce syncope, or the nearest possible approach to it,

* The universe has its centre everywhere—its circumference nowhere.

and the second, if the heart should recover its power, should be carried to the verge of fainting, but not further. This bleeding may be practised in six, eight, or twelve hours, or not till the next day, according to circumstances, the import of which must be interpreted by the physician in each case. In cases of uncommon violence, occurring suddenly in persons of vigorous constitution, the third bleeding may sometimes be within or not beyond the first twenty-four hours after fever is well established. The number of bleedings cannot be brought under any general formula. The greater number of cases do not, I think, demand more than three, provided they be carried to the point I have indicated; but a far more copious abstraction is sometimes required. Thus, I have repeatedly found six or seven bleedings, ranging from thirty-two down to sixteen ounces, as imperatively demanded as two bleedings in other cases. After the third bleeding, however, the physician should be on the lookout for nervous or constitutional irritation, the signs of which should arrest the further use of the lancet. This induced affection not unfrequently manifests itself by a sense of pulmonary oppression, which may be interpreted as evidence of increasing inflammation, and much injury may be done by the further venesection which it suggests; but I must speak of it hereafter, and have only introduced it here as the evidence that the lancet should be laid aside.

It not unfrequently happens in country practice, that the physician is not called in till four or five days or even longer, after the disease is fully formed; and the question then comes up as to the advantage or safety of bleeding. I cannot hesitate a moment in saying that unless the patient be *in articulo mortis*, when venesection would be both useless and absurd, it should be employed. It cannot *directly* remove infiltrations of lymph and pus, but it can diminish the inflammation in parts where it is less advanced; and the loss of blood not only favors the absorption of effusions into the areolar tissue, but increases the susceptibility of the system to whatever medicines may be administered. But such a bleeding should never be carried to syncope. In some of these cases, the smothered pulse becomes more vigorous after the bleeding, as when it is employed in the forming stage, and then a repetition will be found necessary.

When pleurisy is complicated with pneumonia, cupping, after liberal venesection, may be useful, but in pneumonia only, it is utterly inefficient, and by substituting it for venesection, much injury may be done, or rather permitted.

III. After a first full bleeding, the next prescription should be an active, antimonial, emeto-cathartic. Jalap, calomel, and tartar emetic combined, do very well; the powders of the latter two, with nitrate of potash, already recommended in the other phlegmasiæ, are valuable; or a solution of emetic tartar, with sulphate of magnesia, may be preferred. The object is, while the system is yet in the relaxed condition which follows on a copious bleeding, to effect a thorough evacuation of the stomach and bowels. Vomiting

extent *before* bloodletting, it will increase the force and frequency of the heart's contractions, following in that respect the same law with opium.

3. *Tartar Emetic.*—Since the Italian practice of giving this medicine in large doses has been introduced into the Interior Valley, calomel and the compound I have mentioned have been much less used than formerly, even the lancet has been less freely used. I have myself for many years adopted this practice, and can add my humble testimony to that of the great men of the profession, who have borne witness to its efficacy. Yet I am not quite convinced that it possesses any advantage over the antimonial in minute doses, aided by or aiding calomel and digitalis. I invariably administer it in one-grain pills, every two, three or four hours; but in cases of high phlogistic diathesis give two at once. That tolerance of these largest doses, so generally observed by others, I have often seen, and, like them, have regarded its disappearance as evidence that the inflammation was conquered, or at least yielding. I have not seen gastritis produced by this practice; but should fear it might arise if bloodletting were omitted or but sparingly employed, as some physicians have proposed. There are cases, however, to which the weak solution, with tincture of digitalis, is better adapted. They are distinguished by the gastric irritability and gastrodynia which sometimes follow on the administration of the grain pills, which should therefore be superseded by the solution, the tincture of digitalis not exerting that kind of influence on the stomach.

The three medicines we are considering concur in arresting pneumonia, but not by the same mode of action. They are not therapeutic equivalents. The calomel directs itself against the phlogistic diathesis, and also upon the sero-mucous, vesicular tissue of the lungs. Tartar is undoubtedly a sedative to the vascular system; but, like other emetic medicines, has a specific action on the lungs, reducing and altering the morbid action, while it restores the normal secretion of the vesicles, and contributes to the solution, detachment, and expectoration of their adhesive or fibrinous contents. Digitalis acts, I think, chiefly on the heart, to the end which has been already pointed out.

V. There are other medicines which may be substituted for these; but not, I apprehend, with advantage to the patient, though, in mild cases, they may be successful. The most important are ipecacuanha, lobelia, and squills. I shall not dwell upon them. The most important of the three is squills, which, combined with calomel, is a medicine of considerable power. A pill composed of two grains of each, administered every two hours, soon produces a deep antiphlogistic impression. The effect of squills on the heart is often manifested in great reduction of the frequency of its contractions, while it promotes expectoration, and, at the same time, that medicine, in my own hands, has seemed to quicken the action of calomel on the salivary glands.

VI. Of revulsives, the best is a large blister, followed by smaller ones

not (if he were a skilful rhetorician), but he might make out as plausible a generalization as that which designates the brain, the stomach, the ileum, or the spleen as the seat of the characteristic lesion. But regarding (as I do in the present state of our knowledge) the whole of these affections as secondary local incidents or contingents, and not causes of the fevers in which they are found, they belong to the histories of those maladies. Yet there is a primary pulmonary affection connected with, but not arising from them, which is entitled to consideration under this head. It appears sporadically; also as a sub-epidemic; and sometimes as a wide-spreading epidemic. These modes of occurrence are the same as those of the typhous fevers; but we must not, therefore, conclude that the pulmonary affection has no other cause than the typhous diathesis. This state of the system is in fact generally but a predisposition; the ordinary causes of pneumonia acting upon it to excite the inflammation. But if the typhous diathesis be not the sole cause of this pneumonia, it is manifestly the cause of those peculiarities in the phenomena, treatment, and lesions, which distinguish typhoid from simple, acute pneumonia. Whenever and wherever the typhous fevers prevail, all the phlegmasiæ are modified by the typhous diathesis. To this modification in the case of one, pneumonia, we must now direct our attention.

II. Pneumonia typhodes is characterized negatively by the absence, or comparative absence of the signs and symptoms which express true phlogistic fever, with acute exudative inflammation; yet both fever and inflammation *are* present; and the latter manifests itself at the beginning, or even earlier than the fever, precisely as in the simple acute variety; and not in the progress of the fever, as in typhous, when it is secondary. The access, like that of typhous, is sometimes gradual and protracted, in other cases sudden, and accompanied by a severe chill, and a sunken state of the vital energies, out of which there springs a very imperfect reaction. The fur on the tongue is less white and abundant than in ordinary pneumonia; the heat of the trunk is in excess, but that of the extremities often defective; the pulse displays much variety in frequency and fulness, but is uniformly deficient in force, or becomes so after a single bleeding. The drawn blood forms a loose coagulum, and I have seen it form into separate ones, conjoined by shreds of fibrine, and when a buffy coat appears it is less firm, than in simple acute pneumonia. The intellectual functions are more or less confused and enfeebled at an early period; and coma with subsultus tendinum ere long manifest themselves. The pulmonary embarrassment is very great; consisting of dyspnœa, cough, sense of fulness and constriction, without pain, except where there is extension of the disease to the pleura, and even then it is seldom sharp.

A case of this kind, unaccompanied by the pulmonary affection, would be classed with the typhous fevers; and the same amount of pulmonary affection, in the absence of all constitutional lesion, would identify it with the acute phlegmasiæ.

liar to autumnal fever. The use of the word bilious is equally arbitrary, for in many of the cases now under consideration, no bilious symptoms may be present, yet their connection with the diathesis, which has been announced, is undeniable.

III. Bilious or malarial pneumonitis expresses then an inflammation of some tissue of the lung, in an individual having the diathesis which has been mentioned; and every case may be regarded as a pathological compound, the elements of which are that diathesis and a phlogistic diathesis or morbid impression made by climatic influence or any other agency, as for example the specific remote cause of influenza or measles, but the chief, are the variations of atmospheric temperature and humidity. We are familiar with the fact that such meteorological changes are a frequent cause of relapses, from December to June, in those who suffered from periodical fever in the previous August, September, and October, and may even excite first attacks in persons who were exposed to the cause of those fevers, but escaped during the latter months just named. Now the malady under consideration is a pulmonary inflammation, arising *with* such an attack, or, *in* a constitution predisposed to such an attack, and differs in its phenomena and required treatment, in the mode and degree that may be produced by such a diathesis as compared with a previously sound and healthy condition of the system.

IV. In reaching a diagnosis of this malady it is not necessary to travel through the symptomatology of either autumnal fever or pneumonic inflammation, but simply to refer to some modifications of both.

1. The signs of an intense phlogistic action are less conspicuous than in ordinary pneumonitis. The functional disturbance of the lungs may be quite as great as in the most acute inflammation, but it results largely from sanguineous engorgement, and retarded transmission of blood through the organ.

2. The fever, instead of the continued type of the pulmonary phlegmasiæ occurring in those who have not received a malarial or autumnal fever impress, is subject to remissions even when most intense, while in numerous instances, it displays perfect quotidian and sometimes tertian intermissions. The pulmonary affection follows the same law. When it consists in well-developed inflammation, that condition does not, it is true, cease with the periodical abatement or cessation of the fever, but is greatly moderated to undergo revival with the fever; but when the inflammation is less intense, and the pulmonary lesion consists chiefly in passive congestion, it may so far disappear in the more or less perfect apyrexia, that the term intermittent becomes almost as applicable to the local as the constitutional affection.

3. Such is the derangement of the biliary function in autumnal fever, whether the attack be original, or occurring as a relapse, that in a large proportion of the cases now in our contemplation, bilious symptoms are decidedly present. In some, the secretion of healthy bile is excessive;

and this reconciles the apparent discrepancies of practice pursued in different cases in the same locality, bringing them under the same rule with the diversities required in the same season in different localities. Thus it is in this as in many other diseases, that the study of etiology illuminates both our pathology and therapeutics.

VI. The disease now under examination is one of the most formidable and fatal of our Valley. In the months of February and March it often has a kind of epidemic prevalence; when it frequently carries off a greater number than all other maladies combined. It prevails more in its appropriate localities, than simple acute pneumonitis prevails where no malarial diathesis exists. Thus, that condition of the system, like any other enfeeblement, predisposes to it, and gives to atmospheric change a greater effect than it would otherwise produce. Some of the most dangerous cases are the least inflammatory and most intermittent, presenting, in their phenomena and mode of termination, a great resemblance to malignant intermittents. Those in which the fever most affects a continuous type and the pulmonary affection is most decidedly inflammatory, are in general the least dangerous, because most amenable to treatment. In examining my notes, I find that I have conversed on this disease with more than a hundred and fifty physicians, scattered from the shores of the Gulf of Mexico to those of the Great Lakes, and with their experience, and that published by others in the journals, taken in connection with my own in one of the middle latitudes, I shall proceed to speak of the *methodus medendi* which it demands.

1. *Bloodletting.*—The extent to which venesection is required, or admissible in this malady, is inversely to the autumnal-fever diathesis. When this is slight, the true inflammatory diathesis is predominant, and free bleeding is demanded. The upward graduation is, of course, into that diathesis in its full development, and the treatment must correspond. Thus there are cases in which several venesections, all affording sizy blood, are found necessary. In many others, however, a single bloodletting is all that can be borne. In others, the feeble state of the circulation, or the decidedly intermittent character of the disease, forbids the use of the lancet altogether. This is not merely an *a priori* decision, but a deduction from practice, for a bloodletting has often been followed by a sinking of the powers of life, and increased engorgement of the lungs, with gradual and fatal asphyxia. In cases of this character, the blood is often free from buff, and the coagulum is large. When no, or no further venesection seems advisable, cupping has been very generally employed, and the majority of our physicians speak favorably of its effects. In connection with this remedy, I may refer to counter-irritation. Blisters to the chest, especially when the pleura is involved, often give great relief, and those of a large size should be used. They may be applied at an earlier period than in ordinary pneumonitis.

2. *Tartar Emetic*, almost universally employed in the higher latitudes of the Valley, is either repudiated or very cautiously used in the lower. The

tity every six hours. In cases of an intermittent and ingravescent character, it may, however, be necessary to administer it in much larger quantities, combined with opium, a short time before the expected paroxysm, as for a malignant intermittent.

When the course of treatment here pointed out fails, it may, I think, be assumed, that any other known to us, if, indeed, there be any other, would have been unsuccessful.

VII. Development of Typhous Symptoms.—Almost all our physicians practising where bilious pneumonitis prevails have met with cases (and the number, unfortunately, not a few) in which, at a stage somewhat advanced, coma, subsultus tendinum, low delirium, and a dry, fissured tongue have indicated the presence, to a greater or less extent, of typhous diathesis, engrafted as it were upon the malarial, which still manifests itself by the decided daily remissions of the fever. When we add to these an engorgement of the lung, we have as complex and formidable a combination of pathological conditions as the practice of medicine can present, and one which generally proves fatal.

Bloodletting, even perhaps by cups, is, of course, not to be thought of; but blisters may be advantageously used. Purging is pernicious; but full vomiting, not preceded by long-continued nausea, may at the same time arrest the lesion of innervation, and contribute to disembarrass the lungs. Calomel is no longer of much value. Tartarized antimony, however, may still be relied upon; but should be taken with a liberal quantity of opium, or the latter medicine may be conjoined with ipecac. The sulphate of quinine may still be employed in connection with these formula. Stimulating expectorants and sudorifics are now very important. The decoction of polygala seneka holding carbonate of ammonia in solution, with paregoric, is a suitable formula; the decoction of eupatorium perfoliatum with sulphate or acetate of morphia, constitutes another of good influence; another still is the lac ammoniac with assafœtida. The infusion of serpentaria, wine whey, and even hot whiskey and water, may be requisite. These things may be administered without much deference to the state of the lungs; for if they be hepatized, death is in general inevitable,—if only engorged, they may be relieved by raising the excitement of the system.

I shall reserve what might be said on chronic pneumonia and vomica till we come to chronic pleurisy.

reduces the loudness and distinctness of the vesicular murmur of the affected side; at the same time the sound under percussion may be normal. Early secretion takes place. When this is chiefly serous, it does not affect the respiratory sound, except by accumulation; but when, from a high state of hyperinosis, there is an early effusion of lymph, the roughened surfaces of the two membranes, during inspiration and expiration, emit a rough rubbing or friction sound, the topographical extent of which marks the area of inflammation. This sound disappears first in the lower part of the chest, because the subsiding serous secretion separates the pleuræ from each other, and, for the same reason, it is heard latest in the upper part of the thorax, having in its gradual upward disappearance indicated the progressive rise of the effused fluid. The effect of this effusion is, of course, to reduce, and if it should be copious, to annihilate the respiratory murmur. But, if lost on the affected side, that murmur is loud and puerile over the other, as from the diminished movement of the ribs, and in part from the compression exercised by the effused fluid of the side affected, the other receives and discharges more than its usual quantity of air. At a certain stage of the effusion, the sound of the voice is heard shrill and lamb-like through the stethoscope. This, according to Laennec, arises from its passing through the effused fluid. It has also been said that the lung is compressed by the effusion, and thus made a better conductor of sound. The vocal resonance may, however, at all times be heard through the healthy lung, and in the stage of effusion when œgophony is most distinct, the amount of effusion seems too small to produce much compression of the lung. As the effusion increases, the sounds under percussion grow dull, and when it reaches a certain stage they are flat, with the loss of both œgophony and vesicular murmur, except over the root of the lung. A return of the friction sound, with increase of resonance under percussion, of course indicate that absorption of the effusion has taken place, and that a return of the respiratory murmur is at hand.

III. Treatment.—After all that has been said on the treatment of acute pneumonia, it will not be necessary to dwell on that of acute pleurisy, for the measures are substantially the same in both, though they may need modification in each. The remarks made on venesection are applicable here; but the loss of blood by cupping is more effective in this disease than in pneumonia, because the membrane lining the walls of the chest is the chief seat of inflammation, if we may judge from the effect of motion of the ribs. For the same reason blistering is now more effective, and when the inflammation precedes the fever, or is in the forming stage, a large blister followed by copious secretion sometimes arrests it. When the pulse, however, has become highly excited, the counter-irritant will do no good until after copious venesection, when its effect is often decisive. Calomel is of greater benefit in this inflammation than in that seated in the vesicular or mucous texture of the lung; and may be administered in small doses, amounting to twenty, thirty, or forty grains in the twenty-four hours, till the inflam-

CHAPTER XVII.

PLEURISY, ACUTE AND CHRONIC—PLEURITIC CO

SECTION I.

ACUTE PLEURISY.

I. Diagnostic Symptoms and Signs.—Fo
and unmistakably declared by their symptom
pneumonia, it sometimes creeps on gradually.
pain always warns the patient of its app
pain precedes the fever, and is at first mis
neuralgic aching of the intercostal muscle
the ribs. In other cases, a severe chill
is not felt till it occurs, or even not
This being established, the pulse l
changes its character but little till t
It is rarely or never smothered or
when the inflammation dips into t
generally seated near the middle
vated by coughing, sneezing,
resists the whole. I have ev
arrest the ascent of the rib
which produced the pleuri
chial catarrh, when a mu
However this may be, it
for the bronchial mem
sufferings of the pleu
pulmonum, this resu

II. Physical S
leave no doubt as t
not to be neglecte
A respiration

* Dr. C. J. B. Willia
Pleura," after enum
the fallacy of *each*
uncertainty in th
the physical sign
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n of the antime-
is a favorable effect
of diminishing pulse.
on this subject. Whenever
ires here briefly enumerated;
dly, it is in general cured. Yet,
flammation, and with it all the
former to produce serious and per-
e we must now give attention.

SECTION II.

PLEURISY.

rely subdued, the physical signs are not
s of necessity vary according to the stage
efore its arrest. It might be during the
gns be after the separation of the sides of the
ound would be heard, and there would be
might be that while the patient was still
of the serous element of the lymph had taken
friction found, foretelling the restoration of
when the inflammation is only brought down
ible. it generally happens that the resonance is
murmur absent, both these negative conditions
part of the chest where the effused fluid
may be the effect of a pleurisy, mild or sub-
me which has perhaps passed for mere pleuro-

dynia, for which no physician has been consulted. When at length that is done, the signs indicating the stage of effusion just pointed out may be present. Thenceforward the two cases may follow the same law, although commencing with such great differences of intensity.

II. Chronic inflammation of the pleura thus established, is commonly attended with a slight evening paroxysm of fever, which is often followed by some morning perspiration; there is more or less of moderate pain in the affected side; the cough is by no means urgent, and the expectoration is not copious; a sense of weight or fulness exists in the affected side, the ribs of which rise and fall much less than those of the opposite. With these (to the patient) unalarming symptoms, the effusion of lymph, more or less rich in fibrine, and at length that of pus, are constantly going forward; and now it is that percussion and auscultation afford assistance in diagnosis, although at the beginning of an acute attack they were by no means indispensable.

The dulness gradually rises higher and higher up the side until not the least hollowness of sound can be heard except over the root of the lung. The voice and the respiratory murmur as heard through the stethoscope are of course annihilated, while the latter is universally puerile on the opposite side. With the increase of secretion the side bulges out, and the intercostal spaces widen. A deep inspiration introduces no air into that side, for the lung is compressed against the spine and cannot expand; in some cases the heart is forced over to the other side, and I have seen and felt its pulsations, as far on the right as in health they are found on the left side. Great dyspnœa attends this condition, especially under exercise; a horizontal posture is dreaded, and the patient avoids lying on the sound side because it impedes the action of the ribs, and prevents the due inflation of the lung. Such is chronic pleurisy; but there arise other phenomena, previous to the discussion of which it will be convenient to consider what can be done to relieve the patient from his present condition, and prevent any further difficulty.

III. The treatment of chronic pleurisy has two objects in view: *first*, the final arrest of the low inflammatory action; *second*, the absorption of the morbid secretions which it has poured into the pleural sac.

1. In the early stages of this affection, repeated small bleedings, as of eight or ten ounces, are sometimes highly beneficial; but more commonly, cupping is to be preferred. The cups should be successively applied over the whole side; but more especially over the part which may be the seat of pain, or which evinces tenderness under pressure. They may be reapplied every other or every third day, and not laid aside till the symptoms which have just been named are removed, or it is seen that the contents are making their way to the surface by suppurative action. As a further external measure, small blisters may be laid on various parts of the side, after the cupping is no longer employed; or it may be rubbed with antimonial ointment till pustules arise; I have more confidence, however, in blistering. Of in-

SECTION III.

PLEURITIC CONSUMPTION.

I. The cure of chronic pleurisy by resolution and absorption, is not always practicable. In some cases the malady is allowed insidiously to advance beyond the point at which the absorption of the effusion can be effected, the patient being unaware of his situation; in others the physician, from inexcusable ignorance of the physical signs, remains equally unapprised of the organic mischief going on within, till his eyes are opened by the manifest bulging and loss of respiratory movement of the side, as observed without; in others the most judicious and timely treatment proves unavailing. There is a purulent tendency in the system which cannot be controlled; and when the *proportion* of pus in the cavity becomes great, the absorption is much less active than while the bulk is chiefly serum with lymph. The purulent secretion having taken the place of the serous and plastic, the malady begins to assume a new aspect, and thenceforward may be denominated pleuritic consumption. A phlegmasial fever is superseded by a hectic. Occasional rigors become at length concentrated into a morning or evening chill, followed by a *paroxysm* of fever, with a frequent, elastic but compressible pulse, succeeded by a morning perspiration, and gradual emaciation. This striking modification of the symptoms will cease when the pus is absorbed, and the surfaces of the pleura have coalesced; but such absorption is not always practicable, and the pleura is only emptied by the escape of its contents through the walls which contain them. When this escape is outward there is a gradual, obtuse pointing, somewhere between the ribs, and generally in the upper rather than the lower part of the chest. Very commonly, however, it is near the middle of the side where the pain of pleurisy is oftenest found. Sometimes there is a spontaneous rupture, but generally the firm texture of the thickened pleura, which may not give way even when absorption of the intercostal muscle is so complete as to bring the pleura into contact with the skin, renders the operation of paracentesis thoracis advisable. But the escape of the fluid may be inwards. Ulcerative absorption attacks the lung (establishing a topical pneumonia, which cannot, however, be detected by the physical signs), and a channel is excavated into one or more of the bronchial tubes, when a sudden and often profuse expectoration of pus takes place. It is worthy of remark that while abscesses of the liver and spleen sometimes perforate the diaphragm, and discharge their contents by the bronchi, those of the pleura scarcely ever make their way downward. I have not met with a single case of this kind. When the pus does take this direction, the suppuration does not perforate the peritoneum, which would prove immediately fatal, but the pus insinuates itself behind that membrane, where it forms a kind of encysted, abdominal

the pleural sac. There are but two modes in which a cavity can be obliterated,—by the reunion of its walls, when brought in contact, or by the reproduction of lost parts; in both vomica and empyema I suppose the former mode of cure to occur. Not that close and universal adhesion in the case of empyema takes place, but that the contact of the pleural surfaces promotes their union in part, and favors—on the remainder—the reproduction of a free serous surface, with abatement of purulent secretion, the accomplishment of which completes the cure.

III. The distinction which I have recognized between chronic pleurisy and pleuritic consumption is not founded on the extent of the effusion, but on its character. The sac of the pleura may be greatly distended with lymphy serum, containing at length more or less pus, as that secretion gradually appears in the mucus of chronic bronchitis, but this serum may be absorbed and no hectic fever supervene. It may happen, however, that the secretion of pus may be equal to the absorption of serum, and thus without an increase in the quantity of the contents of the cavity there may be a gradual change from the sero-lymphatic to the purulent. Until this change takes place, there is a good prospect of recovery by absorption, under the treatment pointed out in the preceding section. But when the pus comes to constitute the chief material in the pleural cavity, it is doubtful, the quantity being large, whether it is ever absorbed. Now, if this be the fact, as the long compression of the lung is highly injurious, the question may be asked whether the operation for empyema should not be performed much earlier than it is common to employ it? If, under the measures known to excite the absorbents, hectic fever should begin to manifest itself, and no diminution of size in the affected side should be going on, should not the pus be drawn off? The reply should, I think, be in the affirmative. I would even carry this idea further, and suggest the propriety of creating an outlet for the effused fluid at a still earlier period, when the proportion of pus may yet be small. The sinister consequences of long-continued compression of the lung would thus be averted, while the difficulty of subduing the remains of inflammatory action would not, I suppose, be increased. In deciding on the operation, while as yet there is no pointing of the abscess, it is of course necessary to distinguish between empyema and general hepatization of the lung. The dulness under percussion is the same in both; but while in the former there is extinction of the respiratory sounds, in the latter, the solidified lung gives bronchial respiration. Yet if there should be neither bulging of the side nor displacement of the heart, and especially if the disease should be seated on the liver side, it may be prudent to perforate the walls of the side with the sounding-needle, and ascertain the existence of a fluid in the sac.

We do not, perhaps, know the reason why the spontaneous opening of the pleural abscess is generally in its upper part. It may be owing per-

which have often taken place under the genial influence of a warm climate, and hence a fallacious association of ideas has been established in the public mind between such a climate and the cure of tubercular consumption.

Having travelled through the *simple* inflammations, both acute and chronic, of the respiratory apparatus, it only remains to study that which has a peculiar or specific pathological character, the disease which has just been named.

CHAPTER XVIII.

TUBERCULAR PNEUMONITIS OR PHTHISIS PULMONALIS.—ETIOLOGY AND PROPHYLAXIS.

INTRODUCTION.

It is impossible to approach the study of phthisis without a feeling of embarrassment, for we are met by two melancholy facts: *first*, its almost inevitable mortality, and *second*, its great prevalence and apparent increase, notwithstanding the volumes which have been written on its causes, symptoms, anatomical lesions, prevention, and cure.

Every case of this disease presents us with two pathological elements, *first*, a peculiar lesion or diathesis of the general system; *second*, a heterologous deposit in the lungs, with suppurative inflammation. Judged by its progress and products the inflammation may be called peculiar or specific, yet this results entirely perhaps from its occurring in a tubercular diathesis. It is then to the constitutional lesion that we must look for what distinguishes this affection of the lungs from those we have been studying. My own observations require me to adopt the opinion long entertained by the ablest physicians, that the constitutional lesions in scrofula and consumption are specifically and substantially the same, the difference in the progressive phenomena of the two diseases, being chiefly the result of the deposit of tubercular matter in the different organs, although we may not be able to assign the reason, why in one patient it takes the direction of the lungs, in another of the mesenteric glands, in a third of the lymphatic ganglia. Hence I record the strumous diathesis, so ably depicted by Hufeland fifty-five years ago, and the tuberculous cachexia, no less ably portrayed by Sir James Clark thirty-five years afterwards, as but modifications of the same constitutional lesion. I have referred to these as being standard writers; but it is proper to say that the majority of all who have written on these diseases, have with more or less distinctness, recognized this constitutional degradation which I shall generally designate by the term

	REGIONS AND PLACES.	North Latitude.	Total annual mortality in 10,000.	Total annual mortality, one in	Annual mortality from Consumption in 10,000.	Annual mortality from Consumption one in	Deaths from all causes to one of Consumption.	Deaths from all causes to one of Respiratory Disease.	Deaths from all Respiratory Diseases to one from Consumption.
	MILITARY RETURNS.								
1	British troops serving at home: Europe,	56° to 50°	170	59	77	130	2·20	1·66	1·34
2	" " in Nova Scotia and New Brunswick, America—*sea-side*,	48° to 45°	140	71	46	219	3·00	2·07	1·48
3	" " the Canadas: inland and lacustrine,	48° to 42°	152	66	40	248	3·80	2·40	1·58
4	American troops around and among the Northern Lakes,	47° to 42°	140	71	19	526	7·37		
5	" " on the sea-coast, from Maine to New York inclusive,	46° to 41°	146	69	43	231	3·40		
6	" " inland; Upper Mississippi, from Fort Snelling to Jefferson Ba'ks,	45° to 37°	278	36	35	290	7·35		
7	British troops at Gibraltar, Malta, and the Ionian Islands, Mediterranean Sea,	40° to 35°	214	47	32	311	6·70	4·15	1·60
8	American troops, sea-coast, from Pennsylvania to N. Carolina inclusive,	40° to 34°	400	25	63	158	6·35		
9	" " inland; Lower Mississippi to Baton Rouge,	36° to 31°	518	20	62	161	9·19		
10	British troops, Bermuda Islands, Atlantic Ocean,	32°	288	35	59	170	4·82	3·26	1·48
11	American troops, sea-side, from Charleston and New Orleans to Key West,	33° to 24°	562	18	68	147	8·26		
12	British troops, Leeward and Windward Islands, Bahamas, Jamaica, Honduras, W. In.	28° to 6°	930	11	63	160	14·76	10·46	1·44
13	British Black troops in the same places,	28° to 6°	386	26	88	113	4·38	2·66	1·66
	Average,		338		54		6·26		
	CIVIL RETURNS.								
	State of Massachusetts, including Boston,		132	77	30	349	4·40		
1	State of Massachusetts, exclusive of Boston,	43° to 42°	122	82	26	382	4·70	3·44	1·22
2	Boston, Massachusetts,	42° 21′	336	30	44	227	11·20	4·70	1·50
3	City of New York,	40° 43′	343	29	43	232	8·00		
4	Baltimore,	39° 17′	235	42	42	239	5·60	4·33	1·32
5	Charleston—Whites and Blacks,	32° 46′	263	38	37	270	7·20	5·46	1·31
6	" —Whites,	32° 46′	253	39	37	268	6·84	5·44	1·25
7	" —Blacks,	32° 46′	302	33	39	254	7·70	5·90	1·30
8	New Orleans,	30°	667	15	49	205	13·60	10·64	1·29
	Rochester,	43° 8′	257	39	39	260	6·67		
	England and Wales, including London,	56° to 50°	218	46	39	256	5·60		
	Philadelphia,	39° 57′	219	46	30	329	7·20		
	St. Louis, 1847 and 1850, { excluding cholera, / including cholera, }	38° 37′	{ 486 / 615 }	{ 21 / 16 }	36	278	13·50		
	London,	51° 30′	251	40	40	253	6·20		

to this, I may mention what does not appear in the table, that in the dragoons and dragoon guards of the British army, serving at home, the number of cases of consumption treated, was, through a series of years, between 6 and 7 per 10,000 annually; while in Jamaica it was 13, or twice as many, the men being, like those in the table, of the same nation.

Our own sea-side posts, north of New York, give 43; those south of that city, as far as the southern border of North Carolina, give 63 per 10,000. The same is true of the posts in the Valley of the Mississippi; those above St. Louis giving 35, those below, 62 in 10,000. The posts around the northern Lakes, between the 42d and 47th parallels, contrast still more strikingly with those around the Gulf of Mexico, between the 32d and 24th parallels, for the former give only 19, while the latter give 68 out of every 10,000. Massachusetts, Boston, New York, and Baltimore, give respectively 26, 44, 43, and 42, while Charleston gives 37, and New Orleans 49.

The black troops who are natives of the West Indies, give the ratio of 88 in 10,000, while the black population of Charleston give only 39. The mortality of the former, from this disease, is in fact higher than that of the white troops serving in England, which is 77 in 10,000. When we compare the latter with troops which serve in the Mediterranean, a different result is presented, but it is more apparent than real. Thus the average for Gibraltar, Malta, and the Ionian Islands is 32 per 10,000, or less than half as much as in England. This, however, is but 8 in 10,000 less than in Canada, while it rises 6 in 10,000 over Massachusetts. According to Major Tulloch, moreover, the returns do not indicate the full prevalence of consumption among the troops serving in the Mediterranean; as it is the invariable practice to send to England all who become permanently infirm; and therefore many consumptives die on the voyage, or after reaching home, and of course do not appear in the Mediterranean returns. On this point, that able statistician is perfectly explicit, and expresses the opinion in reference to Gibraltar, that if the number sent away to die could be included in the returns of deaths from that post, it would be seen that it is as much infested with consumption as England herself. This, indeed, he demonstrates by the following table.*

	Aggregate strength of seven years, from 1830 to 1836 inclusive.	Total attacked by consumption in these seven years.	Ratio per 1000 of mean strength attacked annually.
United Kingdom, ...	43,163	286	6·6
Gibraltar, ...	22,868	187	8·2
Malta, ...	15,031	101	6·7
Ionian Islands, ...	24,401	129	5·3
Average of the Mediterranean States, .			6·7

Thus it is shown, that at all the Mediterranean stations, the average ratio

* P. 63, 2.

not easy to answer this question conclusively, from the want of information concerning the prevalence of that disease in the cities of the latter region, but one of which, St. Louis, appears in the table. Comparing it with Baltimore, the two lying nearly in the same isothermal curve, and differing in elevation but four hundred feet, we find that St. Louis has the advantage of 13 in 10,000. When we look at the military reports, we see that Nova Scotia rises 4 in 10,000 above Canada; that our own seaside posts north of New York, rise 8 in 10,000 over those of the Upper Mississippi; but the maritime posts south of New York, are only 1 in 10,000 higher than the posts south of St. Louis. Thus, on the whole, the numbers in the table indicate a greater prevalence on the sea-coast than in the interior.

Now, what are the climatic differences between them? The answer is, that the interior posts are most subject to violent changes of temperature—the maritime to humidity; yet these diversities do not appear to exert any influence on the prevalence of the disease.

Our lake posts present some data for estimating the comparative influence of fresh and salt water localities. They are seven in number, and the figures which represent the mortality from consumption in 10,000, are only 19, representing less than half the prevalence on the sea-coast from New York to Nova Scotia. I confess that I doubt the correctness of this low ratio; but until it is corrected by additional observations we may say that our lake-shores enjoy a far greater immunity from consumption than any other portion of the United States.

Admitting this to be a fact, I am unable to offer an explanation. It cannot be referred to moisture, for the seaside posts in the same latitude have an atmosphere equally abounding in (salt water) humidity; nor is it referable to difference of mean temperature, for that is nearly the same both to the east and west of the Lakes: there is one difference, however, the summers are cool and fresh; but I cannot venture to ascribe the difference in consumption to that cause, and shall leave the matter *sub judice*, with the single remark, that as the garrisons around the Gulf of Mexico suffer from consumption more than three times as much as those around the Lakes, the anomaly presented by the Latter furnishes no evidence in support of the current opinion concerning the origin of a tubercular diathesis from cold and moisture.

It has long been a popular opinion that consumption is less prevalent in regions where the periodical fevers prevail than in others lying in the same latitude; and in the course of my travels through the Interior Valley, I have been repeatedly told that the disease was becoming more frequent as those fevers, from increasing density of population, and consequent cultivation of the country, became rarer. But all the statistics through which we have travelled indicate this greater prevalence as comparative and not absolute, a diminution of autumnal fever being mistaken for an increase of consumption. They, in fact, demonstrate that the cause of periodical autumnal

the (supposed) production of a tubercular diathesis, and its most ordinary issue, pulmonary consumption.

1. The *Arctic Regions.* As one of the poles of cold for this hemisphere is found at the northern extremity of our Interior Valley, a climate, which in Europe would be called Arctic, exists ten or twelve degrees south of the circle bearing that name; and, therefore, the coasts and islands to which I now refer, are those above lat. 60°. I shall take five degrees as an average of their different mean annual temperatures, which is about that of the Arctic Circle itself. The permanent inhabitants of these regions are Esquimaux, who live without exception on the sea-coasts, and for most of the year inhabit snow houses. From the year 1818 to 1833, many voyages and travels of discovery were made by British navigators into those icy regions; and in 1848 they were renewed. Thus we have acquired some data for estimating the prevalence of consumption in the frigid climates, but none which could be introduced into the table.*

In examining the abridged and mutilated histories of these voyages and travels, which have been republished in this country, I find a reference to but two or three cases of consumption among the Esquimaux, and it does not even appear whether they were tubercular or only bronchitic. Captain Franklin and Dr. Richardson, who for two summers had extensive intercourse with the Esquimaux, inhabiting the coasts and islands east and west of the mouth of M'Kenzie River, give no evidence of the prevalence of consumption among them. Captain John Ross, who kept up intercourse with a tribe of those savages for the three years that he remained with his ice-bound ships, in the latitude of 70°, where he found the mean temperature less than 4°, does not speak of that malady; and Dr. Edwards, the surgeon of Captain Parry's ship, which spent two years under the Arctic Circle, in about the same temperature, informs us, that two hundred and fifty-five Esquimaux passed a year near the ships, during which eighteen died, yet not one perished from consumption, and their diseases were more abdominal than thoracic.

Among the voyagers and travellers themselves, consumption seems to have been equally rare. In referring to those of the first period, 1818–33, I find that the sojourn in those regions was equal to that of 1000 men for a year, yet but two deaths from consumption is mentioned, and in one of the patients it had commenced, according to Captain Ross, before he left England; yet, by the table, at least seven would have died in England or the West Indies in the same time of that disease. It appears, then, that the climate of *our* Arctic regions is but little productive of consumption; and it seems probable, that the same is true of the Asiatic regions lying around the other pole of cold; for, on consulting the travels of Wrangell and Erman, I can find no evidence of its existence there.

Now what are the characteristics of the climate which is thus nearly

* See Vol. I. p. 459, and other parts of the article Climate.

sphere as that of the Arctic regions? The first fact which presents itself is the larger quantity (in weight not volume) of air taken into the lungs at each inspiration, than in the temperate and torrid zones, hence the greater supply of oxygen to the blood, and the freer escape of carbon from it. The next is the renewed or the secondary expansion of the air vesicles, from the rarefaction of the cold and dense air by the heat of the body. This rarefaction commences with the inspiration, and continues to increase without any escape of air through the bronchial tubes and trachea, until the beginning of the expiration; and in proportion to the reduction of temperature will be the secondary dilatation of the air-cells; which must be, as we have just seen, a sixth part, or 16·6 per cent. greater than in the torrid zone. Thus while more oxygen is supplied, a greater surface is afforded for its endosmosis to, and the exosmosis of carbon from the blood; the capillary vessels at the same time becoming proportionately multiplied or enlarged in their diameters, and thereby securing to the blood a readier passage through the lungs.

Another effect is connected with the vapor of the atmosphere. Air at the temperature of 5° is capable of holding only (·0572) five hundred and seventy-two ten thousandths of a grain of water dissolved in the cubic foot, but when raised to the temperature of the expired air, about 80°, it can contain, without supersaturation, 1·1727 in the cubic foot. Now this capacity for receiving vapor is but another expression for the power of acquiring or taking it, water being in contact, as of course it is in the lungs. If then air, even saturated with vapor, which it seldom is, at the temperature of 5°, be inhaled, and its temperature be raised to 80° or upwards, it follows that if the lungs afforded no water, it would be expired excessively dry, but we all know that such fact is not the case. It therefore extracts, as it were, the moisture of the lungs, in other words, greatly promotes pulmonary exhalation. But if an air, of the temperature of 80°, saturated with vapor, were breathed, pulmonary exhalation would be nearly suspended; or if it did not contain more vapor than would saturate air at 50°, still it could only receive the vapor which 30° of temperature, that between 50° and 80°, would enable it to receive; while in the other case it would take as much as could be received, by the rise of temperature through 75°, that is, from 5° to 80°. It appears then that cold air received into and heated in the lungs, is a great promoting cause of pulmonary exhalation in the Arctic regions; operating on that exhalation as successfully as a hot air operates on the exhalation from the skin in the tropical regions. Now there is dissolved in pulmonary vapor a portion of animal matter, constituting the lungs an organ of excretion for the decaying molecules of the tissues, as well as for the carbon of the blood; and we may safely believe, that this is one of the modes in which the respiration of a cold air contributes to health and vigor of constitution.

But to what extent does an Arctic temperature affect the functions of the

North. Still further, it has been ascertained by experiment that less carbonic acid is given out in warm than cold air; but if less oxygen be supplied to the lungs, from the greater rarity of the air, is there on *that* account less elimination of carbonic acid? According to experiments on *cold*-blooded animals, which can live for a time in hydrogen gas, oxygen is not necessary to the exhalation of carbonic acid, yet from the fixed relation between the absorption of one and the exhalation of the other, from the high probability that the imbibed oxygen is that which unites with carbon to form carbonic acid, and from the fact that the quantity of oxygen absorbed is precisely that, which, according to the law of diffusion of gases, is required by the amount of carbonic acid exhaled,* I am constrained to believe that whatever can diminish the absorption of one must lessen the exhalation of the other. I shall infer, then, that from two causes less carbon is eliminated from the lungs, in the tropical climates, and this may be one cause of the more copious secretion of bile, into the composition of which carbon so largely enters.

But in all the sea and river-side localities of the torrid zone, the lungs are restrained in their watery exhalation, by the high dew point. If the inspired air had a temperature not many degrees below that of the living body, and at the same time be nearly saturated with vapor, it follows, that the watery exhalation from the lungs will be greatly reduced. It is not so in the Arctic regions, however, even when the air is saturated, for holding but a small absolute quantity of water, with a temperature far below that of the body, the heat which it acquires in the lungs enables it, as we have seen, to receive freely from the blood. It may be said, however, that the skin in hot climates takes on a vicarious function and prevents injury. But we may well doubt, whether one excreting organ or surface can fully and permanently supply the place of another. The objects of the functions of excretion are twofold:—

First. To keep the water of the blood at or near a certain quantity, in comparison with the organic matters which it is to hold in solution or suspension. It is the medium of all molecular action in the living system, and therefore its excess or its deficiency must be unfavorable to molecular movement, and hence the necessity of thirst to keep up a good supply, and of organs of excretion to keep down excess. Now in reference to this end the organs of exosmosis are reciprocally vicarious; suppression of the perspiration may bring on watery diarrhœa or diuresis; excessive perspiration diminishes urinary secretion and checks diarrhœa; and retarded exhalation from the lungs in warm climates increases that from the skin and liver; in colder ones that from the kidneys. Thus, in reference to water, the organs of endosmosis are compensatory, and might permanently perform each other's functions. The water which flows off through all the outlets, cutaneous, pulmonary, renal, hepatic, and intestinal, is precisely the same fluid, and

* Simon's Chem. of Man, p. 116.

Now the other organs of excretion have so little vicarious power, in reference to the carbonic acid, that life is immediately suspended when the lungs cease to throw it off, and we are therefore required to believe that any impairment of that function must produce injury to the system. As to the water, it might pass through other outlets, but then the effete organic matter, the peculiar animal element of the pulmonary secretion, would be retained; and we have no more reason to suppose that it would be perfectly eliminated through the skin or kidneys, than that the peculiar matter of the urine would be adequately discharged through the lungs. Whatever hygrometric state of the air interferes then with the exhalation of vapor from the lungs, retards the escape of one of the peculiar matters of excretion, and begins the pathological state, which its continued retention can establish. As the amount of animal matter exhaled from the lungs is minute, no immediate perceptible injury may appear from the retention of a part, but this does not prove that it may not be a source of the tubercular diathesis, for that pathological state is always developed slowly; nor can we say that so small a failure of this excretion can produce no effect, for it is a violation of one of our physiological laws, and every violation leads to disease, which is but the state produced by some violation.

By these lights we may perhaps see how a hot and humid climate may contribute to the production of a tubercular diathesis, more than one very cold, even cold and humid, and be the less staggered at the evidence of its prevalence within the tropics which our table presents.

In this inquiry, however, we must not limit ourselves to the blood and its excretions, but look at the influence of heat upon the solids.

Among the first applications of pneumatic chemistry to the blood were the speculations of Girtanner, on the power of oxygen in maintaining irritability, and many facts drawn from comparative physiology indicate a connection between muscular firmness and activity and the quantity of oxygen imbibed; it may, therefore, prove an advantage, under this point of view, to live in a cold instead of a hot climate. The reactions moreover which follow on the applications of cold, are familiar examples of its invigorating influence. Still further, it has long been known that animals rendered torpid in all their functions, or even frozen, do not necessarily lose their contractility, but may be often resuscitated; and Edwards has proven, by direct experiment, that animals drowned in cold water can be revived after longer submersion than in warm. By these facts we are instructed that heat exhausts and cold preserves that fundamental vital property; and hence we can understand how the temperature of the North may, by its influence on the solids, maintain their strength and ward off a tubercular diathesis, while that of the South may enervate them, and favor its production, or growth.

The experience of consumptives goes to illustrate this point. They dread cold and frosty weather, because it makes them cough; and hail warm

globe, a tenth part of whom, if not more, die of that diathesis. Its connection with the climates of this zone, presents a most complicated and difficult problem, for climate has both its direct and its indirect influences on the human constitution, and nothing is easier than to confound them. Whether we take the same parallel of latitude, or the same isothermal curve, and follow it from the Atlantic coast to the Rocky Mountains, we find local variations of climate, arising from the contiguity of the sea, the elevation of mountains, the alluvial valleys of rivers, lakes of fresh water, marshes, forests, treeless plains, and barren soils; yet consumption occurs throughout the whole; and who can predict the time when the statistics of that malady will be so extensive and minute as to show which of these local modifications most promotes the origin or growth of a tubercular diathesis? But, under the same curve, we have sparse and compact populations, country and city, field and shop labors, toil and idleness, luxury and starvation, heated, and cold or damp lodgings, occupations which invigorate the body, and those which enervate it, atmospheres of great purity, and others abounding in mechanical, chemical, and organic impurities; all of which may be regarded as negative or positive agencies, which cannot be overlooked in our estimate. If we all lived under the same isothermal curve, this diversity would present the task of a most difficult analysis; but when we take another curve, only a few degrees north or south, we find not only new modifications of climate as we cross the continent, producing of course different effects from the last, but we see in the social modifications which the climatic differences originate, another series of varieties in the modes of living, and the pleasures and labors of the people. Thus, in contemplating the diversities which prevail over the temperate zone, or even within an extensive region like our own Valley, we see that an exact determination of the relative agency of climate, and the different natural and social conditions to which it indirectly gives birth, must be an undertaking of the greatest magnitude and difficulty.

It was on this account that I chose to compare first, the effects of the coldest and hottest climates, where but few other conditions exist to complicate the problem. To what was there said, I have but little here to add. During winter, we have the invigorating influences of the extreme North; through summer, the enervating influences of the distant South. Above the isothermal curve of 54°, which cuts the Ohio River at an acute angle near its middle, we have a predominance of the former,—below it, of the latter. At one time, or in one season, the function of respiration (according to what has been said) is acted on beneficially, at another, injuriously; neither continuing very long. Thus, in reference to this function, the salubrious and insalubrious conditions somewhat counterpoise each other; but the same cannot be said of the function of the skin. In all variable climates, that surface is liable to be at times inadequately protected, and no fact is better established than the influence upon it of the vicissitudes of tempera-

secondary pathological element, the primary, and inevitably fatal one, has been too often overlooked, or placed in a subordinate position.

IV. Hygienic Inferences.—From all that has been said it results, that the opinion long current in the profession, and never till lately called in question, that a tubercular diathesis owes its existence mainly to *cold* climates, is an error. On the other hand, as we have seen, it also prevails, *cæteris paribus*, less in cold than hot climates. But if this be not insisted on, more cannot at most be conceded, than as great a prevalence in one as the other, and, therefore, we can no longer call it a disease of the North, or connect it with degrees of latitude or isothermal curves. The hygienic rule which results from this conclusion, is equally obvious and important. He who has a tubercular predisposition, or labors under consumption in any stage, should *not* seek a warmer climate in winter, but a colder in summer; and, if he live far in the South, it might be well for him to remain in a colder throughout the winter. Happily, our Interior Valley abounds in eligible retreats for carrying out this requisition. Voyages to the Falls of St. Anthony, with a summer sojourn in Minnesota, now a settled region;* a residence on the Island of Mackinac, with excursions into Lake Superior;† voyages down the St. Lawrence to the cool and wild scenery of the Saguenay;‡ and the Chatauque mountain-platform, at the sources of the Alleghany river,§ offer as attractive a variety as can be afforded by any country on earth; and it should be recollected, in reference to the lake country, that our army returns, as given in the table, present it as more exempt from consumption than the Mediterranean, where one soldier out of every three hundred and eleven dies annually of that disease, while only one out of five hundred and twenty-six dies of it at our Lake military stations. In addition to these reports, the consumptives of Florida and Alabama, who may not be able to wander far from home, have a good resource in the beautiful Valley of the French Broad, Buncombe County, North Carolina, where, at the elevation of more than two thousand feet, they can enjoy the comparatively cool and invigorating influence of a climate, which I was assured by its physicians, is but little infested with consumption.

What has been said implies a general recommendation to the consumptive and the predisposed to remain at home in winter; but it equally implies that they should not confine themselves to hot rooms, but, contrariwise, should daily seek the open air. If they cannot bear it without cough and difficulty of breathing, it is because the tuberculation of their lungs has made great advances, although suppurative inflammation may not yet have been set up. That, however, is *inevitable*, and, when established, will advance to a fatal termination, the more rapidly the longer and more enervating may have been their confinement in hot apartments.

Thus far I have spoken of general climate, and must now refer to local,

* See Vol. I. p. 149. † Ibid. p. 347. ‡ Ibid. 432. § Ibid. 397.

of physiological deterioration. He should not keep his eye on one only, that which happens to strike him as the most threatening, and rest his hopes of escape upon countervailing or diminishing its effects. He may greatly abate them, and yet fall a victim to other causes which had given him little alarm; while, if they had been obviated, that which seemed most threatening might have proved harmless.

II. Insufficient Exercise.—I have already discussed this subject, a branch of general hygiene.* Such is the nature of the living body, that deficiencies influence it as injuriously as excesses. A law is violated by our omitting what it enjoins, not less than by our doing what it forbids. In ethics and jurisprudence, the omission assumes the character of a positive offence; and in hygiene, to neglect the performance of what a physiological law demands, is in all respects as bad as to do or suffer that which it requires us to avoid. An ignorance or inappreciation of this principle is the source of many diseases, and among them of that now under consideration. It is a law of our physiology, that during the growth of the body, it should exercise itself as the great means of acquiring a firm and healthy organization. In the absence of all other causes of a tubercular diathesis, insufficient exercise may not generate it; but with the co-operation of any it is one of the most fruitful. Its agency is, of course, most perceptible and pernicious in large cities, where it is one cause of the greater mortality than prevails in the country around. The physical development of many who are brought up there has the slenderness and softness of fibre which characterize the *hereditary* consumptive diathesis. Exercise, during growth, gives bulk and firmness not only to the muscles of locomotion, but to the heart and vascular system. This is a physiological law. According to another law, by quickening and deepening the respiration, it augments exhalation from the lungs, and thereby wards off that degradation of the albuminous elements of the blood, which favors the establishment or growth of a tubercular diathesis. At the same time, and to the same beneficial end, it increases excretion from the skin, the liver, and the bowels. Thus it is that agencies so unlike, as inactivity, insufficient diet, and variable and humid climate, concur in the production of the same constitutional lesion; and it follows, as a corollary from these premises, that habitual inaction is the most pernicious in those climates, wherever they may be found, which contribute most to the production of this diathesis. When we compare the annual mortality from consumption in Boston, one out of every 227 persons, with that of Massachusetts, one in every 382, we are logically required to ascribe a large portion of the difference, amounting to sixty per cent., to the more active or laborious exercise of the rural population in the open air; and so of our other cities compared with the country around them. Young men and women, children of rich parents, and brought up in idleness; young clergymen, lawyers, and teachers; boys and girls who are kept long

* See vol. i. p. 696.

IV. Bad Clothing.—It has been conjectured that the modern substitution of cotton for woollen clothes is a cause of the increase of tubercular diseases. Cotton is certainly a better conductor of both heat and moisture than wool, and, therefore, less protective of the surface of the body. When the air is both cold and damp, cotton apparel becomes moist much sooner than woollen, and the moisture facilitates the escape of caloric. Thus, in a chill and humid state of weather, or when temperature is very low, or the changes from heat to cold, or *vice versâ*, are sudden and violent, the skin, defended with cotton fabrics, is more liable to impairment of function than if invested with woollens. Our children and youth, especially young females, are most obnoxious to whatever aid this mode of dress may contribute towards the production of a tubercular diathesis. Among the poor and those in moderate circumstances, cotton clothing is extensively used, from its being cheaper than woollen; but the rich, who have not this motive, dress in it to a far greater extent than is salutary. When our clothing is insufficient, we suffer injury by exposure; and to avoid that, impair our constitutions by long-continued confinement in close rooms through the winter. The substitution of cotton for woollen hosiery, and thin for thick leather shoes, is a part of the same system. Another item is the occasional exposure of the upper part of the chest, which from being generally covered inevitably suffers, when unprotected. Finally, the practice of confining that part of the body limits respiration, and interferes with active exercise, whereby the depuration of the blood, and the absorption of oxygen, which it is the function of the lungs to promote, is of necessity retarded. Thus, on the whole we can understand how errors of dress may contribute to the production of a tubercular diathesis, and as, *cæteris paribus*, it prevails most where they most abound, it seems logical to class them among its causes. Errors in bedding contribute to the same sinister result. The children of the rich generally sleep on soft beds with much covering in heated rooms. This renders their solids delicate, and their surfaces, both cutaneous and mucous, over-sensible to atmospheric changes, effects which favor the origin of a tubercular diathesis. But such lodgings are chiefly injurious to young persons who take but little exercise in the open air, and at the same time live luxuriously. To the hard laborer or him who subsists on a meagre diet, they are salutary, and this leads me to say that poor and badly clothed and fed children, to whom *such* lodgings would be a blessing, suffer great injury from sleeping without sufficient protection from the cold. The period of sleep is that in which the exhalation from the lungs naturally diminishes, and that from the skin should increase; but if the young lodge cold, this function is impaired or suspended, and matters which should have passed out of the blood, are retained to vitiate its constitution.

V. Bad or Poor Diet.—A habitually deficient diet, or one that is either of a bad quality, or simply innutritious, cannot long maintain a normal condition of the blood or solids, and therefore may contribute to the

the brain, lungs, or mesenteric ganglia, which destroy so many, who, if they had lived beyond the age of puberty, would have died of tubercular pneumonitis.

VI. Alcoholic Drinks.—Nearly all writers on tubercular diseases enumerate the abuse of ardent spirits among their causes. Some even regard that abuse as one of the most pernicious; but my own observations do not lead to this conclusion. None of the many young women who annually die of consumption have been subjected to this influence, and a majority of the young men of this country who die of that disease, according to what I have seen, were either total abstinents or but temperate drinkers. It is easy to confound the enervating influence of drunkenness and debauchery in promoting the tuberculation of the organs when a hereditary diathesis exists, with the *production* of that diathesis. The former is, doubtless, a fact, the latter should at least be held *sub judice*. The effects of temperate drinking, and of early and moderate intemperance, are certainly not of a kind to generate a tubercular diathesis, if we may judge from the *modus operandi* of generally admitted causes; and before the period of enervation and exhaustion is reached, a peculiar diathesis, which may be called the alcoholic, is established, with subacute visceral inflammations, which are somewhat fitted to exclude every other cachexia. I am aware that many of our army surgeons regard intemperance as greatly promotive of consumption, and I do not deny that in the predisposed it may be an exciting cause. We are now inquiring mainly into the agencies which generate a tubercular diathesis.

VII. Occupations.—Some of these contribute to the generation or growth of a tubercular diathesis simply because they preclude exercise, or confine the patient in damp, crowded, and unventilated places. Others are supposed to produce the same effect by requiring the trunk of the body to be thrown into constrained or unnatural postures, others by subjecting the bronchial membrane to the impress of mechanical atmospheric impurities. Of the first I have already spoken, but may here add that crowded workshops must necessarily have an atmosphere unfavorable to the elimination through the lungs of both carbonic acid and effete animal matter; for, according to the laws of exosmosis, if the air were saturated with those exhalations, none could pass off by respiration; and hence it follows that in proportion as it becomes impregnated with them, further elimination is impeded. In further support of this proposition, I may refer to the researches of Dr. Lombard, in Geneva, which show, that consumption is twice as frequent in persons whose occupations are sedentary and carried on in shops and manufactories, as in "those who labor or take active exercise in the open air."* The second class, when they are of a kind that interferes with a free and defecating respiration, may aid in producing the constitutional lesion, but it is, I think, chiefly by embarrassing the lungs, and thus favor-

* Tulloch.

Of the various causes included in this section, the one which in our Interior Valley is most pernicious, is deficient exercise in the open air. I need not here repeat what has been already said,* but may urge its special applicability to the disease we are now studying.

But all causes of a tubercular diathesis will of course aggravate it, when inherited; and therefore children, bred and born with the predisposition, should, above all others, be defended against violations of hygiene; yet in this country they seldom receive such protection; and sometimes this very infirmity, or, as it is called, delicacy of constitution, leads to a regimen and a destiny the opposite of what is proper. Thus the young daughter of a man of wealth is kept from out-door exercises, and the full and free respiration of pure and cool air; and the daughter of a poor man, who shows a feeble constitution, is educated to be a teacher, or apprenticed to a seamstress, or placed in a factory, to stand nearly motionless for ten hours of the day, instead of being put from childhood at the hardest and heaviest in and outdoor labors of the family. The same is true of sons. He who inherits from wealthy parents a predisposition to consumption, is sent to school and college as early and unrelentingly, as though a long life were as certain a heritage as the family mansion. Exposure to the elements, extended walks, manual labor, athletic sports, and equestrian exercises are neglected, and when about to cross the threshold of society, he falls back into the grave. A farmer or mechanic, in humbler circumstances, has a son whose slender muscular development and consequent feebleness, not less than his early intellectual and moral growth, are ominous of his fate; yet it is assumed that he will never be competent to the labors of the field, or the hard and heavy work of the smith, the mill-wright, or the civil engineer, and he is therefore put to some light, sedentary indoor occupation, or selected to be made the scholar and professional man of the family. Thus he is not only withdrawn from the line of life, on which the hope of escaping consumption rests, but placed under the very circumstances best fitted to bring it on. The melancholy results of these errors are to be seen in the numerous deaths of students, and young physicians, clergymen, lawyers, and other young persons of both sexes, which throughout our whole country swell the annual bills of mortality from consumption.

Another error must be noticed. When the predisposition to tubercular disease is hereditary, it frequently shows itself in childhood by localizations in the eyes, the skin, the cervical ganglia, the joints, the mesenteric ganglia, or the brain; which is too often regarded as an evidence that the lungs will never be attacked, and a diligent course of prevention is therefore neglected. Every child, thus assailed, is however liable to consumption after the age of puberty, and should be subjected to the hygienic discipline which has been pointed out.

But the physicians of this country have little to encourage them to perse-

* Book i. Part iii. Chap. iv. Sect. iv.

deposition of tubercular matter, that they act injuriously. As to th
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where each person enjoys 119 square yards, th
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we have heretofore been taught to believe.

VIII. HYGIENIC RULES.—The prophylaxis sug
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yet soon begin to crumble away.

* Second Report of the Re

is plausible, and I am not prepared to deny its correctness, though I have not met with cases going to sustain it.

2. Chronic disorders of the liver have likewise been thought capable of originating a tubercular diathesis. They may be said in all cases to include a sympathetic or secondary dyspepsia. Apt to carry a similar irritation into the lungs, they may be an exciting cause of the tuberculation of those organs in the predisposed, but I have no proofs of their being able to originate a tubercular diathesis. The gloomy depression of innervation attendant on hepatic disorders, is certainly very different from the buoyant and excited condition of the same function in the tubercular diathesis, and might lead us to doubt the existence of any relation between them.

3. Chlorosis sometimes precedes consumption, but before we assign to the former the power of generating the diathesis on which the latter depends, we must recollect, that they both occur in the same classes and about the same time of life; that in the progress of a tubercular diathesis the catamenial function is generally suspended, although no chlorotic symptoms might have previously occurred, and therefore when consumption follows on chlorosis, there may have been a previous tubercular diathesis producing the uterine derangement, or if that disorder occurred from other causes, it may have been but an exciting cause of the pulmonary tuberculation. That the functions of the lungs are often disturbed in chlorosis is certain, but the greater number of such cases terminate favorably, showing that tuberculation had not taken place.

4. Bronchitis and influenza are often followed by consumption, and are then said to be its causes. But they are not capable of originating a tubercular condition of the general system, and can only be regarded as promoting the deposit, or the softening, of tubercle in the predisposed.

5. Hemoptysis, in connection with consumption, should be viewed as an effect of deposited tubercle, and is therefore far removed from the causes which generate the diathesis on which the deposit depends.

6. A long, slender or flattened chest, sometimes bent forward, giving great prominence to the scapulæ, is often spoken of as a cause of tubercular consumption. But this is an inversion of cause and effect. Such an osseous conformation is the result of a hereditary tubercular diathesis, and a sign that the individual will probably die of consumption. It may even aid in heightening the diathesis, and promoting the pulmonary affection by interfering with the full and healthy play of the lungs, but does not make it the cause of the tubercular predisposition. It must be admitted, however, that a badly developed respiratory apparatus may so far fail in absorbing and excreting power, as to favor a deterioration of the blood.

7. Fevers, eruptive, typhous, and periodical, are sometimes followed by consumption. I am not prepared to admit their sufficient influence in the production of a tubercular diathesis, yet they may co-operate with other causes. When they occur in the predisposed, however, they unquestionably

vering activity, in pressing on the people these or any oth
vention. The shrine of Plutus, Mars, Hymen, Apollo,
dess of the Pantheon, is thronged with warm-heart
Hygeria counts but here and there a reluctant devot
prone to active medication when ill, nor any less g
disease. He who might reverse these estimates
term of human life throughout our extended V
ment by the side of that now rising to the ho
prevented a different disease.

SECTION

PATHOLOGICAL CAUSES OF A TUBE
PARENTS—CONTAGION—

I. VARIOUS DISEASES.—It is v
occasionally occurs in the progre
and when this happens, they st
there is much room for fallacy
the progress of a tubercular
lungs or lymphatic ganglia,
generating the predisposit

1. At all times disord
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by a tubercular
which fungus hematodes
diathesis in two daughters.
the mother is doubtless much
practice among the female sex
met with many cases of consump-
ther cause. I shall not attempt to
her offspring this predisposition; but
and follows the commencement of
function declines into a final cessation.
from the statistics of marriages and
example, the returns of the State of
that between the ages of 5 and 10
is equal; but from 10 to 20, that of
But we may safely conclude, that the
puberty; and, therefore, that from the
proportion of female deaths must be
been expressed, that is, by calcula-
From 20 to 30, it is one and a half to one;
third to one: and from 40 to 50, equal.
similar form, stand as follows:—

	Males.	Females.
	100	100
	100	240
	100	150
	100	130
	100	100

a remarkable mortality among females
fourteen years, and that it continues high,

in comparison to that of males, up to the fortieth, but especially so to the thirtieth year. Now what is the relation of this mortality to marriage? If we suppose it to begin at the fifteenth year, we have, according to the same returns between that and the twentieth, for males only 1·6 per cent. of the whole, but for females 27 per cent., or more than a fourth; and by the twenty-fifth year, the males making only 45 per cent., the females rose to 73 per cent. Thus we see that nearly three-fourths are married before they are 25 years old; and hence, a very large proportion of births occur during the period of great disease and mortality of females, the logical conclusion from which is, that as far as a tubercular diathesis can have its origin in the bodily infirmities of parents, it comes incomparably oftener from the mother than the father. We are not discussing here the transmission of a tubercular diathesis from a parent in whom it exists, yet it is worthy of remark, that it prevails during this period in females over males at the highest ratio, rendering it probable that the causes which lead to this early mortality, impress the systems of the former with a proclivity to tubercular disease, which may manifest itself in the children of many who do not themselves die of that malady. Of these causes, premature marriage is unquestionably one of the most pernicious. To it, chiefly, we must ascribe the extraordinary mortality of females, compared with males, between the fifteenth and twentieth year, when the proportion of marriages is as seventeen to one. It must be admitted, however, that after the tenth, and especially the fifteenth year, the mode in which girls are brought up is far less favorable to health, and the formation of a vigorous constitution, than that of boys. But on that very account early marriage is the more pernicious.

That children, born after the commencement of those irregularities which precede the extinction of the catamenial functions, are very often infirm, is a generally admitted fact; and that a tubercular diathesis may be among the infirmities is highly probable. The following case fell under my own observation. A married couple, entirely free from tubercular lesion, and belonging to families equally exempt, left three children in infancy from non-tubercular diseases, but reared seven to adult years. Of these, six were free from tubercular diseases, but the seventh, born after repeated attacks of exhausting menorrhagia, and not long before the final cessation of the catamenia, was, without any obvious cause, about the age of puberty, seized with scrofula of the cervical ganglia. I might dwell on this important branch of our subject much longer, but it has been so admirably illustrated by M. Lugol, in his Researches on Scrofulous Diseases, as to render a more extended presentation of it unnecessary.

III. Contagious Propagation. — The tubercular diathesis, whether hereditary or induced, has been held to propagate itself by contagion; but not till after tubercular suppuration of the lung has been established. This opinion, which dates back to the earliest ages of the profession, has chiefly

inflamed under the expectoration of its contents; the escape of the same contents into the cavity of the pleura, produces immediate inflammation; and, lastly, I have been assured by a gentleman of accurate observation, who in the country often sat in front of his door while in the expectorating stage of phthisis, that when the domestic fowls swallowed his sputa, as they sometimes did, the effect was vertigo, under which they would fall and lie for some time on the ground, before they could walk away.

4. Without referring to books, I may state that many of our own physicians have met with apparent contagious propagation; generally where it would be most likely to occur, that is, in the conjugal state; and therefore under circumstances the least equivocal, seeing that it does not often happen that both the parties belong to consumptive families. This very day I was informed by Professor Miller, that in his (extensive) practice, he has repeatedly seen wives attacked with phthisis soon after nursing their husbands through that disease, *et vice versa*. This I have myself often witnessed, and may mention a single case which occurred long since. A newly married woman, having an hereditary predisposition, fell into phthisis soon after the birth of her first child; while at the breast it became affected with the same disease, which, I admit, might have been entailed upon it. Being poor, the family inhabited a single room, and the husband was the sole attendant on both, with whom he also lodged. Soon after their death, without having any known predisposition, he was seized with the same malady, which proved rapidly fatal. The following observation was communicated to me by Dr. Carroll. The daughter of a man who had a family predisposition to consumption, returned home from school with that disease. Her mother, a robust woman, nearly fifty years of age, and entirely free from hereditary taint, nursed her without intermission, and slept in the same bed with her. Soon after she died, the mother was seized with the same malady, and died also.

With such facts before us, we may, I think, regard it as highly probable that one of the causes of a tubercular diathesis is the continued or frequent inhalation, and the slow absorption of gaseous or suspended tubercular matter, exhaled by a phthisical patient.

5. As a general fact, in all cases of contagious propagation there is a period of incubation, during which no sign or consciousness of disease may exist, and the duration of this period is exceedingly various. In small-pox it is sometimes sixteen or seventeen days, and in hydrophobia as many weeks, perhaps even months. Now, we have only to admit that the tubercular virus has its own and a somewhat protracted stage of incubation, to understand how it might be operative in the production of the disease in others, and yet be quite overlooked; the attack being ascribed to various agencies which, at most, might be only exciting causes. Nor can we raise a valid argument against this hypothesis from the fact, that many who are exposed, do not suffer; for this, from idiosyncrasy, happens in the case of all conta-

milder way; when it had become so great that tuberculation of the lungs had, or was about to begin, her child was born with consumption. In this case there was no obvious external cause for her diathesis, nor for that of her scrofulous children; but her own, like theirs, was hereditary.

What proportion of all cases of consumption and scrofula depend on hereditary transmission, will perhaps never be known. The ratio is, of course, greatest where the external, pathological, or other occasional causes of that diathesis, are least operative, the prevalence of the disease being the same. This much we may affirm, that if the tubercular diathesis were to lose its place among the hereditary predispositions; and we had no cases of consumption but those produced, *ab initio*, by the causes we have reviewed, that disease would no longer be, as it now is, the greatest of all single causes of mortality.

In attempting to decide in certain cases whether they should be referred to entailment by parents, or to other causes, we are liable to fall into error, and generally, perhaps, to underrate the influence of transmission. Thus, if we see an individual, while exposed to a rigorous climate, or following some occupation of suspicious effect, become the victim of consumption or scrofula, we are apt to ascribe it to that influence, instead of hereditary predisposition; when, at most, it might have been only an exciting cause. Again, as it is not necessary to the transmission of a tubercular diathesis, that the parent shall labor under actual consumption or scrofula, children may, by hereditary attaint, be attacked with either, while both parents seem healthy; and then the malady is generally ascribed to external or non-hereditary agencies. A gentleman in this city had a wife who died of consumption, and all her children but one fell a victim to that disease, which, of course, was supposed to be derived from her. When, however, he had reached his 60th year, he himself died of a pulmonary disease, which I ascertained by post-mortem inspection to be tubercular. Now, it is obvious, that if he had married a woman free from that disease, the children might have derived a predisposition from him, and, had he died of any other malady at an earlier age, their attacks might have been ascribed to external or producing causes, instead of hereditary transmission. This gentleman, in early life, had been a land surveyor in the wilderness, which had doubtless warded off the disease; and his case may stand as the representative of many others, in which a proper hygiene defers the attack to the latter part of life, or nullifies the diathesis altogether. I look upon this diathesis as so intimately connected in origin with adolescent nutrition, that I cannot avoid believing, when a tuberculization of the lungs occurs after the 50th year, there was either a congenital predisposition, or a proclivity created during the subsequent stages of growth. A large proportion of those who are said to die of consumption in old age, are undoubtedly the victims of chronic bronchitis; but if they had a slight tubercular taint, that inflammation might produce a limited tuberculation of the lungs.

of in the United States, suggests, that those who are predisposed to this and other fatal hereditary diseases, should be prohibited from marrying. It is quite certain, that they ought not to marry; but no restraints can be imposed but those of moral suasion, which, if earnestly pressed upon the young by physicians and parents, might to some extent do good; but I am sorry to say, that very little is ever attempted by either. Parents see their children contract matrimonial alliances without informing themselves on this point, or even with a full knowledge of the existence of a predisposition to consumption. When they know that a cherished daughter has that infirmity, they see her married at 16 or 18, with no more apprehension than if she were 25, and had no known predisposition. The fact that she will probably die after the birth of her first or second child, leaving it a sickly charge on their hands, makes no impression on their hearts. Young physicians, also, who are strongly predisposed, marry as early and unhesitatingly as if they enjoyed the finest constitutions; and, in choosing wives, seem never to inquire into their predisposition to this or any other disease; or, knowing the worst, do not find in it a reason for restraining their impulses. This indifference to the future, bad enough in any state of society, is peculiarly deplorable in ours, where early marriage prevails among all classes. Without insisting that those who might entail a tubercular diathesis on their offspring should never marry, I may urge, that they should not marry precociously. We have seen the great mortality of consumption between the 15th and 30th years of life. Taking the sexes together, consumption destroys one-half of all who die from every kind of disease in Massachusetts, between those dates; and the number, compared with the population, is still greater in our cities. Now, if all who married during that period had deferred it, many of them would have escaped it altogether, and none would have left children to die of the same malady, before or after having transmitted the fatal taint to another generation.

The continued influx of European immigrants, and the unsettled and migratory habits of our native population, carry the predisposed into every climate and locality of our great Valley. Thus, we are deprived of the opportunity of studying the influence of external causes in the production of a tubercular diathesis. When a family leaves the sea-coast of New York or New England to settle on the dry and rolling prairies of Illinois or Iowa, it may bring, in some of its members, a predisposition which may be ascribed to the climate of the new home; another may carry the same predisposition from the centre of Pennsylvania to the shores of Lake Erie, and when the disease becomes developed, the humid atmosphere of the inland coast may be blamed for what would have occurred if no removal had been made. But the greatest impediment to successful inquiry is produced by the incessant emigration from North to South, which is promoted by the general mortality which prevails in the latter, and by the popular opinion that the predisposed should seek a more southern residence.

fore, brought to the conclusion, that its connection with climate is not of that intimate kind which has been asserted, and that additional data are necessary to a final decision.

2. Consumption prevails more in our cities than in the country, showing either a greater prevalence of the tubercular diathesis there, or a more energetic action of the causes which promote the deposit of tubercle in the lungs. Among the former we may recognize insufficient exercise, luxurious, or innutritious diet, defective clothing, confined lodgings, unventilated dwellings, and different chronic diseases; among the latter, the inhalation of an air loaded with mechanical impurities.

3. The causes of a tubercular diathesis exert their most pernicious influence during the period and upon the function of adolescent nutrition, which they enfeeble and degrade. But the causes which promote the deposition of tubercular matter in the lungs, may act at any time.

4. There is some reason for believing that tubercular consumption may be communicated by contagion.

5. But the immediate cause of its extensive and somewhat equal prevalence, under climatic and other circumstances widely different, is hereditary transmission of a peculiar diathesis. This proclivity is ingravescent, and may end in consumption independently of all co-operative agencies; yet it may be promoted by many, of which two of the greatest are deficient exercise and premature marriages. On the other hand, it may be retarded, if not subdued, by hygienic regulations.

CHAPTER XIX.

TUBERCULAR PNEUMONITIS CONTINUED: DIAGNOSIS OF THE EARLY STAGES, PATHOLOGY AND TREATMENT.

SECTION I.

EARLY DISTINCTIVE SYMPTOMS AND SIGNS OF PHTHISIS.

I. I DO not propose to add an inferior to the many excellent histories of the progressive symptomatology of this disease which are now before the profession, but limit myself to a brief account of its distinctive diagnosis. In the preceding chapter incidental reference has been made to the physiological and psychological aspects of those who are predisposed to this malady, and in proportion as they are present, we may suspect the existence of incipient phthisis when signs of pulmonary irritation exist. Thus, if the patient have (what I may call, without misleading any one) the tubercular

The symptoms and signs thus briefly enumerated, may, I think, be taken as diagnostic of the early stage of phthisis. There are others, however, not to be overlooked. In some cases the mucus which is sparingly expectorated is not merely streaked with blood, but that fluid predominates, and may even amount to a moderate hæmoptysis. But a symptom which occurs still oftener, is a congestion, or very subacute inflammation of the fauces, sometimes extending to the larynx, and producing a feeling of dryness, with weakness, hoarseness, or flatness of the voice. In the female the catamenia are in general reduced in quantity or suspended; pregnancy seems to mitigate—almost to arrest all the symptoms—after delivery, however, they advance with increased rapidity.

Through an indefinite period, in many cases to be measured by months, others rather by weeks, although the heart may beat with unnatural frequency, there is little or no abnormal heat of skin; and the patient cannot be said to have fever; that condition is however impending and inevitable. It generally shows itself, by an almost imperceptible rise; but sometimes by a violent change of weather may be suddenly awakened into sustained activity, with a pulse of considerable resistance; the respiration becomes hurried, the cough more troublesome, the mucous expectoration greater, the pains about the chest more acute, and the subclavicular region becomes tender under pressure. There is now a true tubercular pneumonitis; and it gives such an impulse to the deposit of tubercles, that the physical signs become rapidly more developed. In many cases the fever is neither ushered in by a chill, nor followed by perspiration; yet in others both these phenomena occur before the expectoration of pus commences, though not perhaps before its formation.

With this brief diagnostic statement as a standard of comparison, let us proceed to inquire what pathological states may either simulate or obscure it.

II. Chronic Subacute Inflammation, or Congestion of the Pharynx.—Inflammatory congestion of the membrane covering the tonsils, the palate, and the pharynx, may excite a cough. The œdematous swelling and lengthening of the uvula especially produces that effect. As this cough, like that attendant on the forming stage of tubercular pulmonitis, is accompanied by little expectoration, the question will arise in every case, whether the throat affection is primary or secondary; or perhaps I should rather say non-tubercular or tubercular. The decision is not always easily made. Other early evidences of a tubercular deposit being present, the affection may be suspected, especially if the throat should be enlarged by the attenuation of its walls. The state of the pulse may be relied upon as far as a single symptom can go. In the non-tubercular erythema, the pulse does not rise in frequency above the natural standard; exercise does not excite it more than in health; nor does muscular effort accelerate the respiration beyond what is normal. In some cases the throat affection is sympathetic of dys-

sibilant rattle. Finally, hot or warm weather mitigates the bronchial much more than the tubercular affection.

VI. Hepatization of the Lung.—A dry cough, frequent pulse, and dyspnœa under exercise accompanying this affection, but an acute pneumonia has generally gone before; and if seated in the lower part of the lung, the conclusion is against tuberculation, for that state would (probably) have invited the inflammation into the upper part of the organ. The physical signs are here of much value. The absence of abnormal sounds in the apex with the presence in the base of dulness and bronchial respiration, may be regarded as conclusive; if, however, the inflammation should have been seated in the apex of the lung, the sounds become identical with those of tubercular induration; and have no distinctive character. If symptoms of incipient phthisis should be present, the decision should be in that direction. Much of the induration may, it is true, be the effect of common inflammation; but how much we cannot tell, and the fact of its attacking that portion of the lung is suspicious.

VII. Chronic Pleurisy.—There may be cough with moderate expectoration; a frequent pulse and dyspnœa, increased by exercise; but in many cases an acute pleurisy has preceded. The patient prefers to lie on the unsound side, or avoids lying on the sound. Our chief reliance, however, might be on the dulness of the lower part, if not the whole of the affected side, and the absence of respiratory sounds, with a normal condition of the sounds of the apex, if it be not surrounded by the effused fluid. At a subsequent period such a patient may present himself to the physician complaining of a dry cough, more or less pain or uncomfortable feeling in his side, and dyspnœa under active effort; the same symptoms, moreover, may follow on a pleurisy so transient as not to have distended the sac with effused fluid, to be afterwards absorbed. In both cases, the essential difficulty results from permanent adhesions by false membrane. The sounds of the affected side may be normal. Under such circumstances, the collapse of the side after great effusion, and the freedom of the apex of the lung from all abnormal sound will guide to a correct diagnosis.

VIII. Spasmodic Asthma.—It is only in the forming stage of this malady, that the symptoms which characterize it can be at all confounded with those of incipient phthisis. But the dyspnœa is distinctly paroxysmal, and the cough is not habitual. In the paroxysm, the difficulty of breathing is much greater than any which attends early tuberculation of the lung; which, moreover, sounds well under percussion. A resort to the stethoscope discloses sibilant or chirping and mucous râles over the whole of both lungs, which cease with the paroxysm. Thus the differential diagnosis is not obscure.

IX. In addition to these common affections of the lungs, we must recollect that the aerial passages are occasionally the seats of *polypous*, *fibrous*, *warty*, or *epithelial*, and sometimes *malignant tumors*, and that the lym-

unaccompanied with much fever. I could make nothing of it but a laryngeal or pulmonary affection. It gradually declined in strength, and at length became paralyzed on one side with strabismus, and dilated pupil; dying with the closing though not the antecedent symptoms of hydrocephalus. It is likely, however, that this was a case of low tubercular affection of the brain, and that the lungs were in the same state, but a *post-mortem* inspection was not permitted.

XII. Dyspepsia.—Morbid sensibility of the stomach and bowels, or mild chronic gastritis, with acidity, flatulence, and epigastric tenderness on pressure, affects both the heart and lungs. The former becomes irritable, with paroxysms of palpitation. A cough, sometimes hacking and sometimes spasmodic ensues. Occasionally the bronchial membrane takes on increased secretion, and expectoration occurs. There is often a considerable degree of pharyngeal congestion with increased secretion of mucus, and the tongue is foul, with a dirty, moist fur, especially on the posterior part. The intercostal muscles in some cases partake of this sympathy, and are more or less the seats of wandering pains or aches. The distinctive diagnosis of such a case is to be found in the presence of the gastric symptoms, which, in the highly developed tubercular diathesis are rare, yet not always absent. But the physical signs may protect us from error. As long as the sounds of the lungs continue natural we may assign the pulmonary symptoms to the stomach as their pathological cause. We must not forget, however, that the era of dyspepsia and tuberculation are the same, that bad modes of living may induce the former in a constitution prone to the latter, and that its influence on the lungs might be to promote the deposit of tubercular matter; a search after which should be frequently made by percussion and auscultation. Cases of this kind, in which the morbid condition of the stomach acts as the exciting cause of pulmonary tuberculation, constitute the dyspeptic consumption of Sir Wilson Philip.

XIII. Hepatic Disorders.—These are well known to excite cough, sometimes dry and short, at other times accompanied with bronchial expectoration. They also give a frequent pulse, and pains or achings not only in the shoulder, but frequently on the right side down to the pelvis. Meanwhile the liver itself may not be the seat of pain, and if no jaundice exist, the affection of the lungs may be regarded as primary, and if so most likely tubercular. When the lungs are examined in such a case, no unnatural sounds are heard, and a deep inspiration can be made without exciting cough, as in the case of spinal irritation and gastric disorder. The patient moreover prefers to lie on his right side, and has a dyspeptic state of stomach, with bowels alternately affected with diarrhœa and constipation; finally, his complexion is generally turbid or sallow, the opposite to that in tuberculation, and his urine is yellow, if his eyes and skin should not be jaundiced.

XIV. It is unquestionable that a certain degree of hæmoptysis is frequently attendant on tuberculation of the lung. It seems not to have a

shall mention, in connection with the early stage of phthisis, is relapsing intermittent fever. This form of fever is well known as the cause of chronic diseases of the liver and spleen, both of which disturb the functions of the lungs. Those organs moreover are often left irritable by the fever in autumn, and throughout the ensuing winter and spring are liable to catarrh. Thus a cough with some expectoration may be kept up, and the fever frequently relapsing, with each paroxysm ushered in by a chill, and followed by more or less perspiration, the case may sometimes put on the aspect of phthisis advanced to the hectical stage. The history of the case will aid us in this diagnosis, and those who hold that malarial fever (so called) is preventive of phthisis, will be satisfied of the absence of the latter when they recognize the presence of the former; having, however, unquestionably seen a coalition of both forms in the same patient, I would look for other means of differential diagnosis in the cases we are considering. These may generally be found in the manifest lesion of some of the abdominal organs, and in the absence of the physical signs of phthisis, with the presence in many cases of the signs of pulmonary catarrh.

I have dwelt long on the differential diagnosis of incipient phthisis, but not unprofitably, if what I have said should direct the attention of the reader more forcibly to the subject that it may have been before. Having written, *currente calamo*, I cannot suppose either that all has been stated that might be, or that all advanced is absolutely correct. The value of an exact acquaintance with this subject is twofold: *first*, it prevents our neglecting the treatment appropriate to the different maladies which simulate the early stage of phthisis; *second*, it enables us to resort in due time to such means as seem most likely to arrest the progress of tuberculation. We must now proceed to a brief inquiry into its pathology and treatment, before the stage of suppuration.

SECTION II.

PATHOLOGY AND PROGRESS OF PHTHISIS.

I. Stage of Non-Inflammatory Deposition.—Neither tuberculation nor inflammation alone constitutes developed phthisis, but their combination. These pathological conditions may reciprocally produce each other. Tuberculation may begin, and continue increasing for a while, before inflammation is developed; and conversely, inflammation may be the primary, tuberculation the secondary, lesion. A tuberculous diathesis, inherited or induced, is necessary to the tuberculation of the lung, or any other organ. Under its existence, the constituents of tubercle are combined and deposited in the vesicular, and sometimes the areolar, tissues of the organ. When the constitutional lesion is great, this deposit may occur without the action of any

lungs of persons in this stage of the disease do not, of course, very often occur.

We do not well understand why the lungs are so much oftener the seat of tubercular deposits, than any other organ. Those of the fœtus in utero do not escape; but pulmonary tuberculation, both before and some time after birth, is less frequent, compared with that of other organs, than in adult life; and the older the individual grows, the more exclusively is the deposit confined to the lungs. The same is true of the pseudo-melanotic deposits in those organs which have been shown by Pearson and others to be largely carbonaceous. But why is the deposition of this matter chiefly made in the lungs? Because, as I suppose, they are the great organ for eliminating carbon from the blood. If we assume that they are also charged with eliminating animal matters, which being retained, contribute to the development of a tubercular degeneracy of the vital fluid, we may, perhaps, see a corresponding reason why they become the special seats of tubercular deposition; and why, before they have commenced their special function, they are not more frequently affected with tuberculosis than other parts. In support of this view, we may refer to what has been said on the causes of a tubercular diathesis, many of which seem to act by impairing directly or indirectly the excretory function of the lungs. It certainly seems plausible that the albuminous elements of the blood may be thus transformed into an isomeric body, resembling fibrine, which under the law which determines different excretions upon different organs, would seek an outlet by the lungs, and from its spontaneous coagulability, accumulate in the air vesicles, or, as sometimes happens, in the connecting cellular tissue.

I may also refer to the tubercles which are often seen in organs distant from the lungs, which show no traces of inflammatory action; also to the interlaminar deposits of tubercular matter in the cornea, which sometimes precede strumous ophthalmia; and to the deposits in the organs of animals which have been kept, experimentally, on low diet, in confined and damp places. This deposit of tubercular matter in the lungs, is the first *local* effect and evidence of a tubercular diathesis tending to the production of consumption, and constitutes the first organic lesion in phthisis, the condition on which the incipient pulmonary symptoms depend; and when the amount of deposit is sufficient, the first modification of the physical signs. If no inflammation should arise, there will be no phthisis. If the deposit is not copious, and the tubercular diathesis should, in any mode, be corrected, the tubercular matter is decomposed and partially absorbed, leaving behind the chalky or pseudo-bony matter, which is sometimes expectorated, at other times found in cysts of condensed areolar tissue. Phthisis, in such cases, may be said to have aborted.

II. Inflammatory Stage.—We must now turn to inflammation. When it occurs in the lungs of one who has no tubercular predisposition, the lesions which ensue are those we have reviewed in the preceding chapters on the

a hectic, but a phlegmasial fever; yet I have seen indications of the remittence and of the morning perspirations, which so eminently characterize the former. The pulse, in general, undergoes duplication in its frequency, is always quick in the stroke, and elastic under pressure, but rarely tense or hard, as in the simple phlegmasiæ. In this stage of the disease, the thoracic symptoms indicate increased violence of inflammation, and the physical signs disclose augmented lesion of structure. The inflammation very commonly extends to the pleura and generates pain; which, however, is not as much augmented by coughing, or a deep inspiration, as in ordinary pleurisy seated lower down, because there is less range of motion in the upper ribs, and the pleura of the lung is more affected than that of the thoracic walls. The crepitant râle is seldom heard, by reason of the louder bronchial sounds, but the latter are modified by the mucous rattle, which the inflammatory involvement now sets up. Finally, the dulness under percussion becomes greater, and its area more extended, in proportion to the increased secretion of coagulating lymph and tubercle, and the hepatization of portions of sound lung.

The duration of this stage is indefinite, and not, I think, according to any known law. It is certainly not short in proportion as the inflammatory symptoms are intense, provided they be not moderated by treatment; for some of the most rapid cases of phthisis do not manifest inflammatory violence. The tubercular diathesis is perhaps highly developed in such cases, and the infiltration of the lung correspondingly rapid and extensive. The termination of tubercular inflammation is invariably in suppuration. The previously deposited tubercle softens. By some pathologists the softening is regarded as a solution, by the fluids secreted around, by others, as a vital process of degradation commencing within it. We need not, however, resort to this hypothesis, if we recollect how many membranes and vessels are necessarily enclosed in a tubercular mass. They are quite sufficient to account for the internal softening, if we suppose them brought into the same kind of morbid action with the unenclosed parts. Nevertheless, I see no objection to admitting, that many tubercles may have a low and imperfect vital organization; for they are doubtless composed of altered and degraded fibrine, which may depart from its normal condition in slighter or greater degrees; and, therefore, some may possess imperfect vital properties, while others are altogether destitute of them. Abscesses filled with tuberculous pus are now formed, and at length discharging their contents into the bronchial tubes, a more copious expectoration ensues; and the suppurating stage is established.

III. Hectical Stage.—Tubercular suppuration being established, the fever undergoes a modification, and becomes more intermittent. Its type is quotidian, and sometimes doubly quotidian, that is, there is a morning and an evening paroxysm, preceded by chilliness and followed by perspiration. In the apyrexia the heat ceases, but the pulse seldom falls in frequency to the normal standard. We are apt to think of this fever in con-

heterologous material is expectorated, lymph takes its place, the cavity is obliterated by the expansion of the lungs, union of the sides occurs, gradual contraction and absorption follow, and the surface of the lung over the little cavity displays a foveolous and puckered aspect. In other cases, a quantity of carbonate and phosphate of lime with animal matter, giving it the appearance of putty, remains, and is surrounded by a capsule of condensed areolar tissue—false membrane. In other cases still, but I have not met with such, the sides of a larger cavity do not coalesce, but it remains a permanent open sac, lined by or composed of fibro-cartilaginous membrane, with a pseudo-mucous surface. In these different cases of termination in health, the antecedent of recovery is the correction of the constitutional diathesis.

The name of Laennec will for ever stand in connection with the means of verifying the lesions which have been enumerated in this and the preceding section. When a cavity is filled with unexpectorated matter, if it be near the anterior or posterior surface of the lung, the parts above emit a duller sound under percussion, the respiratory murmur is absent, and no vocal resonance is heard; but when empty, or but partially filled, its existence is made known by a cavernous or gurgling respiration,—by a hollow sound, if percussion be made during a deep inspiration, and by pectoriloquy, when the patient speaks. As the cavity enlarges, the area of these phenomena extends; and when the excavations are multiplied, without communicating with each other, the absence of the phenomena over their partition walls discloses the fact with a certainty only surpassed by that which depends on the knife of the anatomist.

I wish I could speak in terms of equal admiration of the utility of these discoveries in diagnosis. Those by which we are apprised of tuberculation of the lung in its early stages, are undoubtedly of great and precious value, for they admonish us to lose no time in resorting to whatever hygienic and curative measures experience may have pointed out; but the discovery of fatal ravages of structure, a few months or weeks earlier than they would be disclosed by *post-mortem* inspection, cannot fairly be placed as high on the scale of utility as of mere diagnostic achievement. As still further detracting from their practical value in the very emergency in which they are most needed, they are perplexingly simulated and rendered uncertain. Thus in chronic, non-tubercular bronchitis, there may be such dilatation of a bronchial tube as to give respiratory and vocal sounds, which even the most disciplined ear may confound with those emitted by tubercular cavities. The rule, that by changing the position of the stethoscope we shall discover a cylindrical cavity in the latter case, and one more or less circular in the former, is not infallible, for the tubercular excavations are often more or less elongated; yet we should by no means neglect this method. We must, moreover, place some reliance on the extent of mucous or sibilant rattle, generally, or always greater in bronchitis than in tubercular con-

rent pathological element. Thus, in phthisis, preceded by well-developed dyspepsia, or accompanied by biliary derangements which leave in the blood the elements of bile, there is often a hypochondriacal despondency which might mislead us in our diagnosis, but for the instructive lessons of auscultation and percussion.

SECTION III.

TREATMENT OF PHTHISIS.

I. The views which have been taken of pulmonary consumption separate it from the simple phlegmasiæ of the lungs, give it a constitutional origin, and represent the local affection as secondary. The primary lesion of constitution they regard as one of feebleness and degradation, in both the solids and fluids, and teach that when inflammation and fever arise there is increased action with diminished power. They further instruct us, that these inflammatory excitements do not terminate spontaneously; but are kept up by the tubercular diathesis of the constitution, which must, therefore, be corrected before they can be arrested.

II. Treatment before the rise of Inflammation and Fever.—Most of what might be said under this the most important therapeutic head, has been anticipated in treating of the causes of a tubercular diathesis, and need not here be repeated. I may, however, insist that it is only by attention to the stage which precedes phlegmasiæ that we can hope to accomplish anything in this malady. Every remote cause must be obviated, and when an hereditary predisposition exists, the means of correcting it should not, as usually happens, be neglected, till signs of pulmonary tuberculation show themselves. All who are prone to consumption should know that this is the stage, and almost the only one, in which the disease can be arrested; yet it is generally the only one in which the least is attempted, partly, I am sorry to say, because we do not urge on the predisposed and the exposed, that hygiene, which only can prevent or retard the full development of the tubercular diathesis.

Disregarding repetition, in a matter of such deep practical importance, I propose here to condense the prophylactic suggestions scattered through the chapters on the causes of this malady.

1. The predisposed should especially avoid from childhood all the causes which are known to favor the production of such a diathesis, or promote the deposit of tubercular matter in the lungs; and those who have no hereditary entailment should break off from any and every course of life which keeps down their flesh below the natural standards, or excites cough.

2. An active, even laborious life, is indispensable, as promoting free excretion from the lungs and skin, and giving firm vital cohesion to the solids.

parations seem to be the only anti-tubercular agents as yet discovered. That they are incapable of arresting phthisis when fully formed there can be no doubt; but might they not control the forming stage, or contribute to correct the predisposition. In that milder modification of the tubercular diathesis which has received the name of scrofulous, they are unquestionably antidotal; and they certainly deserve a fuller and longer trial in the stage we are now studying than they have yet received. In cases accompanied with debility and little tendency to fever, especially those of a chlorotic or anæmic character, the hydriodate of iron would be most proper; but with less reduction of the vital forces and greater tendency to fever, the hydriodate of potash would be preferable. Unfortunately, however, for all experimental medication in this early stage of the malady, patients generally regard it too lightly either to apply for advice or submit to the regular and protracted use of any remedy.

III. Treatment of the Phlegmasial Stage.—The rise of inflammation and fever is more or less rapid, and according to the constitutions of patients the phlogistic excitement is more or less intense. When violent it must be met with antiphlogistic treatment, for as the inflammation is one of the causes of pulmonary disorganization, it may soon destroy life if it be not moderated. It must never be forgotten, however, that *tubercular pneumonitis cannot be cured by antiphlogistic treatment, however urgent may be the indications for its use.* It is but palliative. Both the inflammation and the fever may be moderated (but they cannot be subdued), except in the case occasionally met with, in which the tubercular degradation is slight, and the inflammation has been awaked by external and common causes. I have not greater faith in any therapeutic conclusion than this, having seen the antiphlogistic method fail in a number of cases indefinitely great, while I never saw it succeed in one where the evidences of tuberculosis were well marked; and if I am not mistaken, this accords with the present state of experience both in this country and Europe. A depleting and debilitating treatment, moreover, is not merely ineffectual, but often injurious by favoring a more rapid progress in the tuberculosis; and hence there is an additional reason for employing it with circumspection and reserve.

The means which I have generally seen employed, are bloodletting, tartar emetic, digitalis, calomel, and blisters; which may be taken as representatives of the whole. It may be said of all that they cannot with safety to the patient be pushed as far as in simple pulmonary inflammation, wherever seated, of the same grade of excitement. Thus, copious and quickly repeated bloodlettings, grain doses of tartar emetic, liberal portions of digitalis, and calomel in salivating quantities are inadmissible; and each must be employed to a limited extent only, or the patient will be brought into a state of exhaustion, from which he may never fully recover. He may be relieved from many of the sufferings dependent on the inflammation; but still it goes on to suppuration, and the tubercular diathesis is increased.

ever, of the former kind, because, as we have seen, it deposits tubercle as well as lymph, and that heterologous substance immediately promotes suppurative action. Thus nature is thwarted in her *methodus medendi*, and the work of pulmonary disorganization goes on to a fatal termination.

2. *Antiphlogistic Treatment.*—If the antiphlogistic treatment cannot arrest the inflammation which precedes all suppuration, much less can it subdue the stage we are now considering. It is, indeed, no longer admissible, except now and then, when some exciting cause has quickened the inflammation into great activity, or extended it to the pleura, the bronchial tubes, or to portions of the vesicular structure not previously affected. Such exacerbations must of course be met with antiphlogistic measures; but we must ever bear in mind that they are but protective against new lesions, not curative of those previously existing, and may, by their exhausting influence, accelerate the death of the patient. As a general rule, it may be affirmed, that all depletory and debilitating measures are not merely ineffective but positively injurious in this stage. Thus low diet, venesection, sedative nauseants, such as tartar emetic, squill, digitalis, colchicum, sanguinaria canadensis, and lobelia inflata; a salivation, and unrelenting counter-irritation with blisters, tartar ointment and issues, should be prohibited, except under the temporary aggravations of the inflammation, which have been mentioned. In purulent bronchitis these agents are of unquestionable value, and this has too often led to their officious administration in the suppurative stage of tubercular inflammation, when an opposite method would have been preferable. To that method we must now devote a few paragraphs.

3. *Tonic Treatment.*—While the treatment which has been reviewed looks to the inflammation in the lungs, the tonic or corroborant method looks to the tuberculosis of the general system, a condition which keeps up the inflammation. There is undoubtedly a degree of the latter, which, for the time being, contra-indicates all agents which increase the excitement; but we assume it as a therapeutic law, that in all fevers and inflammations of a specific kind such agents are, on the whole, more admissible than in corresponding grades of inflammatory orgasms depending on common causes. Thus diffusible stimulants have been administered in scarlatina with apparent advantage, or, at least, without injury, and opium and sulphate of quinine may be given in our remittent autumnal fever, under grades of excitement which would render them inadmissible if it arose from an ordinary cause. The usual intensity of hectic fever and suppurative tubercular inflammation of the lungs, does not, in fact, exclude the tonic treatment, and my own experience carries me with those practical men, who have preferred that method to the opposite, under which, if it have been correctly asserted, the sufferings of the patient are less, but his strength is more rapidly wasted away. I am far from affirming, that the corroborant treatment can be made radically curative, but its tendency is in that direction; and under its influence we generally see the strength of the patient

4. *Miscellaneous Remedies—palliative and curative.*—As in cancer, hydrophobia, and other incurable diseases, so in phthisis, many things have by persons, both in and out of the profession, been bruited abroad as radically curative or strikingly palliative. The cases cited in support of their claims have probably sometimes been of the mild and limited kind of which I have spoken, but much oftener of non-tubercular, chronic bronchitis. Most of the bepraised measures have no doubt palliated the symptoms, and afforded comfort to the patient, whereupon it has been supposed, that had they been employed earlier, or with greater regularity, or had the patient not "taken cold" (the common expression for the exacerbations to which all consumptives are liable) they would have eradicated the disease. By this kind of reasoning a palliative has been raised to the dignity of a radical remedy. A milk diet; breathing an atmosphere impregnated with carbonic acid, chlorine, oxygen, and other gases; emetics of the sulphate of zinc or copper; the tincture of digitalis; hydrocyanic acid; the inhalation of the vapor of boiling tar, and the drinking of tar water; the inhalation of ether holding cicuta in solution, and the same use of volatilized iodine in combination with that vegetable narcotic, have all had their day; and while the whole, in different cases, have mitigated the violence of particular symptoms, none have perhaps done more. It is unnecessary to repeat the instructions for their use contained in all our text and hand-books of practice.

The present object of hope and trial is COD-LIVER OIL. My own experience and observations afford results from this article, which correspond with those of the profession at large. It is one of our best palliatives, but, with some apparent exceptions, unequal to the cure of consumption. It must be admitted, however, that its use has been so generally deferred to an advanced stage of the disease, and this will probably ever be the case with most remedies, as the forming stage of consumption seldom comes under the observation of a physician, often indeed proceeds without the notice or consciousness of the patient. From the great variation in the duration of consumption, it is, I think, uncertain whether this medicine has the power of prolonging life; yet the abatement of most of the symptoms, the temporary arrest of the emaciation and the partial restoration of the tissues, especially the adipose, seem to indicate that life *may* be prolonged by it. The theory started on the discovery of iodine and bromine in cod-liver oil, that the benefit of its use in phthisis depends on those agents, seems at present to be waning, on the ground, in part, that they exist in quantities too minute to produce any effect. This, however, is gratuitous. The average results of the analysis of five specimens of cod-liver oil by Herberger,* gave ·972 of a grain of iodine in 1000 grains of the oil, and ·151 of bromine in the same. Taking these together, the proportion is 1·122 in the 1000 grains. Thus, without going into fractions, it may be affirmed, that every ounce of the oil contains nearly half a grain of iodine, and more than that amount of

* Pereira, vol. ii. p. 805.

CHAPTER XX.

CARDIAC INFLAMMATIONS.

SECTION I.

INTRODUCTION.

THE inquiries which I have made lead to the conclusion that inflammations of the tissues of the heart are not often recognized by our physicians, either during life or after death. This may be attributed to two causes. 1st. It must be confessed that most of us, from studying so little in hospitals, are but little skilled in the differential diagnosis of cardiac diseases, and generally content ourselves with the discovery that the patient has a *disease* of the heart. 2d. When it proves fatal, the opportunity of inspecting the organ is not often afforded. But after making due allowance for these reasons why cardiac inflammations do not seem to be of frequent occurrence among us, I am disposed to believe that in reality they are not so common in this country as in the great cities of Europe. I can certainly say, that through the last twenty-five years, during which I have known more of their diagnosis than before, the number of cases in my own practice, or which I have seen in consultation, has been small. In the *post-mortem* examinations at the Louisville Marine Hospital, for the last nine years, inflammatory lesions of the lungs, spleen, stomach, bowels, and liver, have been so frequent, compared with those of the heart, as to show conclusively that each of them is far oftener inflamed than that organ. Nevertheless, I cannot doubt that many cardiac inflammations exist undetected by us, and are referred to two other heads, to which, indeed, we are prone to refer nearly all cardiac affections—these are morbid irritability and hypertrophy. The former of these is undeniably a frequent disorder, but among the cases which occur in young men, there are no doubt many real though undistinguished inflammations. Hypertrophy, so called, is also not very rare, but in many cases there was, no doubt, an inflammation not recognized at the time, to which the structural derangement should be referred. Both for the interest of society and the credit of our profession, it is desirable that we should have a better acquaintance with the diagnosis of cardiac diseases, especially inflammations in their early stages. The reluctance of surviving friends to allow *post-mortem* inspections, as a means of verifying our diagnosis, tends greatly to discourage the study of the latter; but we should not forget that a cardiac inflammation, not speedily reduced, eventuates in some form of organic lesion, the supervention of which is in some degree a substitute for the dissection of those who die, inasmuch as it proves that an inflammation had existed, thus illustrating our diagnosis,

while its proper treatment would be the same which their inflammations require, and hence, in reference to its symptoms and treatment, it is unnecessary to assign it a distinct head. Even pericarditis and endocarditis often coexist, or mutually excite each other, and in their early stages manifest themselves by symptoms so much the same, that it will simplify their study to enumerate such as are common to them and also to carditis.

II. Early Symptoms of Acute Cardiac Inflammation.—In whatever tissue it may be seated, this inflammation when acute is accompanied by fever, in which the patient often complains of a burning and acrid heat of the skin. The pulse, always increased in frequency, is in other characteristics exceedingly variable; unequal in the number of beats in equal times, generally intermittent, sometimes full, at others small and contracted. In the region of the heart there is pain, either dull and constant, or occasional and lancinating. In some cases it extends beyond the cardiac region, and attacks the pectoralis and the muscles of the left arm. Now and then it invades the diaphragm, and seems to be in the abdominal cavity. Invariably there is a sense of anguish in the region of the heart, and upward pressure against the diaphragm in the epigastrium or left hypochondrium increases both this symptom and the pain, while it disturbs the heart's action. The same effects follow pressure over the intercostal muscles. A sense of tightness or constriction occurs across the præcordial region. Dyspnœa and a dry, hacking cough are never absent, and both are increased by every kind of effort, even change of posture. Under attempted exercise, the tendency to fainting is very great, while the pulse becomes much accelerated. When the precordial region is examined by the ear, the sounds of the heart are found to be loud, and its movements sudden, convulsive, irregular, and with strong impulse. The brain never fails to sympathize. The spirits of the patient are always depressed, and delirium often supervenes. These symptoms being present, we can scarcely doubt the existence of cardiac inflammation; but still, before declaring the diagnosis of the case, it is necessary to ascertain that the inflammation is not seated in the precordial pleura, or in the portion of lung which occupies that region. This being settled, in the mode hereafter to be pointed out, the case may be pronounced cardiac inflammation, but its special seat will remain to be determined.

III. Early Symptoms of Subacute Cardiac Inflammation.—When an inflammation of any of the tissues of the heart comes on slowly and insidiously, its detection is often difficult; and it is sometimes supposed to exist when it does not. For a long time it may be that the lesion of function in the heart is unproductive of any decided injury of structure, without which the physical signs, ultimately so intelligible, are obscure or ambiguous; still it is of great moment to ascertain its existence in time to avert the organic lesions on which those signs depend. It is no part of our duty to wait for the ravages of a morbid action, as a method of ascertaining its

pain, oppression, or uneasiness, if the heart be inflamed; but only a discontent with the position, from hearing the sound and feeling the movements of heart, if it is not.

b. Icteric.—I use this term as a convenient expression of that state of the system which is present when there is a defective secretion or excretion of bile, and consequently its elements are left in the blood, to irritate and depress the nervous system. Palpitations of the heart are often present in such cases, and suggest in the patient an apprehension of "disease of the heart." Should the biliary derangement arise from hepatitis, occasioning fever, there would be some ground for suspecting cardiac inflammation; which, however, is very seldom consequent on hepatic inflammation. This fact, taken in connection with the *criteria* presented in the last paragraph, will generally conduct us to a correct decision.

c. The Hysteric.—Individuals of both sexes, who have a lymphatic temperament, are liable to palpitations of the heart, which are induced by slighter exciting causes in women than men. Their decidedly paroxysmal character, together with the presence of other hysterical symptoms, and the immediate antecedent action of some exciting cause, moral or physical, will generally enable us to declare that they do not depend on inflammation. If, however, a person of the temperament we are now considering should labor under habitual constipation with alvine accumulations, or from great depletion of any kind have fallen into a state of general debility, or is subjected to the protracted influence of some depressing emotion, or is given up to secret and impure indulgences, the palpitations may become so constant and convulsive as to suggest the possibility of cardiac inflammation. Under such circumstances, we must depend on a searching scrutiny into the causes, external and pathological, which may be acting on the patient, and consider them in connection with the symptoms of cardiac inflammation already mentioned, when we shall generally be brought to a correct decision. In this case the appearance of the drawn blood may aid in the diagnosis. If there be no cardiac inflammation it will be free from buff.

d. Chlorotic.—This diathesis is very often attended with palpitations, which are prone to be habitual, though subject to exacerbation. When the stethoscope or ear is applied to the precordial region, a bellows, or some kind of murmur, one of the signs, as we shall presently see, of endocarditis, is often heard. When blood is drawn it is generally buffed. The subjects of it, moreover, are of the age most liable to cardiac inflammation. At first view, therefore, these cases would seem to present much diagnostic difficulty; but we are not without the means of removing it. 1. Young men are most subject to cardiac inflammation—young women to chlorosis. 2. The signs of chlorosis are generally well developed. 3. The abnormal sounds of the heart are variable, and may cease and be renewed in chlorosis, while they are constant in endocarditis. 4. In the latter, the blood is but little reduced in its red corpuscles, the buff depending on excess of fibrine;

SECTION III.

PECULIAR SYMPTOMS AND PATHOLOGICAL CHARACTER OF PERICARDITIS.

When the inflammation is seated in the pericardium, that membrane, the cellular substance beneath it, and, doubtless, the exterior part of the muscular substance, are gorged with blood; in other words, they are swollen, and when percussion is made, the area of dulness is found to be more extensive than in health, provided the patient be erect or inclined a little forward when the observation is made. But another pathological condition contributes at an early period to the same phenomena. As in all other cases, the inflammation is no sooner set up than a secretion of serum and coagulating lymph into the cavity of the pericardium commences, and by distending that sac, augments the region of dull sound. If this effusion should be copious, it diminishes both the impulse and sounds of the heart, and might lead us falsely to suppose that the inflammation had abated. On this effusion depends a physical symptom, now universally regarded as pathognomonic. In health the heart, in its systole and diastole, moves within the pericardium, which is attached below to the diaphragm, and above to the cardiac extremities of the great vessels, without friction; but when the internal surface of that membrane has become roughened with lymph, or flocculi of fibrine are rolled between the cardiac and pericardiac serous surfaces, a friction sound is generated. Such a sound might result from blood extravasated into that cavity; but in the case of hemorrhage (other than that which occasionally occurs, to a small degree, from parts which are intensely inflamed) the rational signs of inflammation which have been enumerated will be absent. Being present, the rubbing or friction sound becomes demonstrative of pericarditis. This sound has received a variety of names from different writers, but compared by most of them to the creaking of new leather, to rasping, grating, or the rubbing together of two pieces of parchment. For all practical purposes it is quite sufficient to indicate it as a sound emitted by the motion of two roughened surfaces on each other. But this sound is not heard in every stage of the disease, for the surfaces must be near each other to produce it. Thus, at the beginning of the effusion, it may be present in a moderate degree, then cease, because the quantity of *liquor sanguinis* has become such as to part asunder the surfaces which throw it out, and then return when the serum has been absorbed and the membranes are shaggy from adherent lymph. There are but two sounds emitted by the thorax with which this can be confounded: 1st. That occurring in pleurisy from a similar pathological cause. To discriminate them from each other, it is only necessary to direct the patient to hold his breath, when the latter will of course cease. 2d. That given out by the valves of the heart when in the condition to be presently described. This, however, is loudest near the base of the heart, seems deep-seated, and is single, while that produced in the pericardium is heard equally over the

in the end not less dangerous. An acute may become a chronic case; but the inflammation may have been subacute from the beginning. It may even have been so mild that little else than serum was thrown out, when it would possess the character and receive the name of hydropericardium. Subacute inflammations may, however, occasion the slow effusion of both lymph and pus (the latter, it appears, to a greater extent than the acute form of the disease), and gradually bring about the anatomical lesions which have been described. The rise and progress of such cases are insidious, and their diagnosis difficult and uncertain. As they are distinguishable in their early stages from acute cases, only by the greater mildness of the symptoms, no special diagnosis can be given. In their advanced stages the lesions and symptoms dependent on them are the same as in the latter stages of the acute form of the disease.

Pericarditis may be complicated with endocarditis, pleurisy, and pneumonia, the signs of which combinations can be best presented under those respective heads.

SECTION IV.

ENDOCARDITIS: SYMPTOMS AND PATHOLOGICAL CHARACTERS.

When the inflammation is endocarditic, the hyperæmia of the lining membrane, and the subjacent cellular and muscular substance, together with a greater or less retention of blood in the cavities of the heart, from interrupted egress, gives increased size to the organ and consequent dulness under percussion, beyond the ordinary præcordial region. This dulness may be distinguished from that attendant on pericarditis with effusion into the sac, by the sounds and impulse of the heart being more distinctly perceived, from the organ's being nearer the parietes, and by the pulse being generally weak, small, and extremely frequent, from the interrupted exit of blood, although the action of the heart is powerful. It may also be distinguished from the dulness attendant on permanent hypertrophy, by the suddenness and recentness of its occurrence. The pain is in general less acute than that of pericarditis, but the oppression, anguish, anxiety, and sense of suffocation are greater. Flexion of the chest increases these symptoms as much as in pericarditis, but pressure over the intercostal muscles is better borne than in that affection, because it does not act upon the inflamed membrane. The pathognomonic symptom remains to be mentioned; a blowing or bellows murmur, which sometimes assumes a metallic, a sawing or rasping sound, which marks or obscures one or both the normal sounds of the organ. As long as the valves of the heart remain healthy and perform their functions with regularity, these sounds are not heard, their occurrence then is evidence of valvular lesion, and this results from the inflammation of the membrane of which they are the duplicatures.

Every part of the pericardium performs the same function, and hence it inflammation is in general spread equally over the whole; but the lining membrane of the heart performs unequal function. In the cavities of the organ it merely protects the muscular substance from the direct impress of the blood, and gives a polished surface for the fluid to move over; but at their orifices, where it is folded into valves, it not only serves these purposes, but additionally permits the blood to pass, and then prevents its regurgitation. Few parts of the body indeed perform a more incessant function, and none are more liable to have it increased, seeing that every cause which accelerates the circulation, quickens the action of the valves. Thus we might believe, *a priori*, that endocarditis would direct itself on the valves, rather than on the general surface of the cavities, and if we may rely on the revelations of morbid anatomy, such is the fact. In every acute inflammation of the endocardium, coagulating lymph is no doubt thrown out upon the free surface of the membrane, much of which is immediately washed away by the torrent of the circulation; when, however, the inflammation is so intense as to roughen the surface, particles of fibrine begin to adhere, and rapidly augment its capacity for fixing other particles. Thus begins that valvular lesion which constitutes the specific anatomical character of endocarditis, and generates the pathognomonic bellows sound. But all the fibrine which thus accumulates on the valves is not secreted by their inflamed membrane. The blood is in a state of hyperinosis, and at all times a foreign body projected into its current through an artery will collect shreds of fibrine. The roughened valves cannot fail to arrest portions of that element as it flows along, and this operation may continue long after the inflammation has ceased, and the secretion of lymph been terminated. Minute and curious pathological anatomists, with ample hospital opportunities, may trace out many varieties of valvular lesion thus produced, but to the practical physician that kind of knowledge is not essential. It is sufficient for him to know that the valves may lose their normal form and facility of action; may suffer agglutination to each other; may become loaded with tufts of fibrine called vegetations, or with lumps of the same element; may be torn; may be so contracted as permanently to diminish the size of the orifices;—in short, may, from change of structure, not only retard the passage of blood into, through, and from the heart, but fail to prevent its regurgitation under the reaction of the arterial system. In any of these conditions we have, when the ventricles contract, the bellows-sound, or some other kind of murmur equally indicative of valvular derangement. When the physician hears these sounds he must not, as a matter of course, pronounce the cause of them permanent, and regard the case as hopeless, for mere swelling, or the slightest roughening of the valves may occasion them, and such a condition is remediable. The length of time they have lasted must, in general, determine his prognosis. When the ear or hand is applied to the præcordial region, under such circumstances, a thrill or vibration is often distinctly perceptible under every

systolic contraction. If the patient be brought under any exciting emotion, and made to exert his muscular system for a moment, this thrill and the valvular sounds will become much more distinct; and if under such circumstances the patient is made to hold his breath, the most inexperienced ear will recognize them to a satisfactory degree.

Endocarditis may attack all the orifices of the heart, and derange all the valves; but observation has shown that the left side is far oftener affected than the right, and its semilunar valves more frequently than the mitral. It is not easy to determine which side of the organ is the seat of the inflammation when one only is affected; but happily in this, as in some other forms of disease, a decision of that kind is not a necessary prerequisite to the treatment.

Endocarditis may prove fatal in a few days. A great tumefaction of the valves may carry extreme derangement into the circulation; the intensity of the inflammation may produce a deep and dangerous lesion of innervation in the heart; the sympathy of the brain may be intense, and its derangement of function further increased by the impeded return of its venous blood, from retarded circulation through the heart; and finally, we suppose that pus is sometimes secreted, and mingling with the blood empoisons the organism—pathological causes sufficient to occasion early death. The majority of cases, however, have not this severity, and soon declining into a subacute grade, assume a chronic form. Many cases indeed are of this kind from the beginning, and not a few are confounded with mere nervous palpitations. Whatever may be the grade of inflammation, its ultimate consequences may be equally fatal, as it eventuates in the same lesions of structure. Chronic inflammations, moreover, sometimes ascend into the aorta, where they occasion deposits of lymph in or beneath the lining membrane, and not unfrequently produce ulceration, a lesion which is sometimes found in the cavities of the heart and on the valves. The lymph deposited on and near the valves, if not absorbed, passes into the condition of fibrous, fibro-cartilaginous, cartilaginous, and osseous tissue, thus increasing their immobility or irregularity of action long after the inflammation has ceased.

Permanent valvular lesions are the pathological cause of extensive and fatal derangements, such as hypertrophies and dilatations of the heart, cerebral and pulmonary lesions, both functional and structural, hepatic disorders, and dropsies of the extremities, pleura, and pericardium,—effects to be hereafter considered in connection with the sequelæ of pericarditis.

SECTION V.

SYMPTOMS AND EFFECTS OF CARDITIS.

However laudable the ambition of those, who, having ample opportunities, in great hospitals, aspire to establish the differential diagnosis of

carditis, it would be labor lost for the country or village practitioner to aim at such nicety. He should be able to detect cardiac inflammation, and even declare in which of the membranes it is seated, but is not bound to decide on the degree in which the intervening muscular substance participates. In fact the most experienced and eminent cultivators of this branch of diagnosis have as yet been unsuccessful; and it seems to be generally admitted, that as inflammation of the muscular is always complicated with that of the membranous tissues, its peculiar symptoms will, perhaps, never be eliminated from the mass.

We cannot doubt that carditis, whether acute or chronic, is a grave disease. Three of its lesions deserve to be noticed. 1st. The secretion of lymph. When this takes place in the cellular tissue of the organ, should the case not prove fatal, the analogous structure, by contraction, so acts on the muscular fibres as to occasion atrophy, while the new structure, obeying the laws of its organization, passing successively through the different grades of induration—fibrous, cartilaginous, and osseous—comes at last to present the transformations which often attract our attention in the dissecting-room. They generally occupy one or several limited portions of the organ. 2d. Pus is sometimes secreted. It may be either infiltrated into the tissue, or collected into an abscess. When this opens through the endocardium, an ulcer is formed, which may ultimately lead to perforation or rupture of the cardiac walls, and a fatal escape of blood into the cavity of the pericardium. Professor Harrison met with a case in which a great number of small ulcers, excavating the outer substance of the heart, discharged their pus into that capsule.* 3d. The muscular tissue may soften, under either acute or chronic inflammation, and, at last, be ruptured.

In the year 1828, I witnessed a case illustrative of this termination, and of the symptoms attendant on chronic carditis affecting a part of the heart only.†

R. B., a native of England, aged sixty-seven, of large stature and rather inclined to corpulence, but of an athletic temperament, sober in his habits, and for more than forty years, a laborious cordwainer, had been for half his life afflicted with some variety of psoriasis on both arms. Eighteen months before his death, it left its original seat and attacked his head and face, causing the loss of his eyebrow, and giving to the affected skin a sooty hue. After the lapse of a year it moved down to his chest, from which it disappeared before his death. Soon after fixing itself on this part, he began to experience paroxysms of pain in his heart. What other symptoms existed I cannot state, not at that time being his physician; but I learned that he was treated with stimulants and narcotics. Two months after this period, on being called to see him, his respiration was somewhat embarrassed, but he had little or no cough; his pulse was intermitting, rather increased in frequency, but not very strong; he had a slight swelling of the abdomen,

* Gross's Path. Anat., 2d Ed., p. 492. † West. Jour. (Cin.), vol. ii. p. 337.

and considerable œdema of the feet and legs, which were habitually cold. His tongue was clean, and his bowels easily moved; but his appetite was gone, and he frequently vomited. His spirits were habitually depressed, and he often shed tears. In the day he slept a little; but his morbid vigilance and restlessness at night were distressing in the highest degree, and accompanied by a kind of delirium. His chest, under percussion, sounded well; and, through the stethoscope, a *feeble* respiratory murmur could be heard over every part. On resorting to the instrument, with a view to the movements of the heart, I could distinctly perceive its intermissions; but neither its sound, impulse, nor volume, seemed to be remarkable; the two former were, indeed, rather weak. He could lie on either side, and on his back, in a horizontal posture, without difficulty.

During the treatment to which I subjected him, the dropsical symptoms disappeared, but all the rest gradually increased. He was bled once; but no benefit followed, though the blood was sizy. Up to the close of life, his most constant and characteristic symptoms were habitual, intermitting pulse, occasional vomiting, epigastric anxiety, dyspnœa, deep depression of spirits, debility, and confusion of mind, taciturnity, and morbid vigilance alternating with coma. He was long *in articulo mortis*, with distressing agitation of the heart and convulsive action of the muscles of respiration, especially the diaphragm.

Dissection.—Permission was granted to examine the contents of the chest and abdomen; but circumstances limited us to a period of time too short for a perfect search into their condition.

On proceeding to open the thorax, the cartilages of several ribs, on each side, were found in a state of ossification, and required the use of the saw.

The lungs did not collapse, and *seemed* to be universally emphysematous. As far as examined, they were neither tuberculous nor hepatized. No pleuritic adhesions existed; but in examining for them, I was surprised to find a quantity of dark, fluid blood in each side of the chest. In the right, it scarcely amounted to an ounce, but in the left there was, by estimate, more than two ounces.

The heart was enveloped in an extraordinary quantity of fat. It was of the common size; but far from the ordinary shape, its apex being enlarged and tuberous. It was evident from external inspection that the pericardium contained no water; and on cutting through that membrane, with a view to turn out the heart, it was found adhering to that organ throughout its whole extent, indicating a universal pericarditis. At its junction with the pleura of the diaphragm, the effects of inflammation were equally obvious, and extended to some distance on the surrounding parts of that organ. At the point of union between the two, the pericardium had given way, and about the aperture there was a quantity of red, pulverulent, pulpy matter, which was the muscular substance of the heart transformed by disease. In cutting upwards from this place at right angles to the septum, so as to divide

2. *Muscular Exertion.*—The muscular system of animal life acts physiologically upon the heart. In loud and long speaking, violent running, jumping, climbing, swimming, lifting great weights, and carrying heavy burdens, the blood is returned rapidly upon the heart, and interrupted in its passage through that organ. In these efforts respiration is irregular, in locomotion it is hurried, in lifting heavy weights it is suspended, the individual always making the effort after a deep inspiration. Now while a free expiration and subsequent suspension of breathing exerts but little influence on the fulness, force, frequency, and regularity of the pulse, a full inspiration retained, increases the frequency of the pulse twenty-five per cent., reduces its volume until the artery at the wrist feels almost empty, and renders the action of the heart irregular. It would appear from these facts that when the lungs are greatly inflated the passage of blood through them is impeded. Thus in muscular effort accompanied by deep inspiration, two causes of accumulation in the right cavities of the heart, and in the coronary veins co-operate, to wit, a more rapid return of blood from the muscular system, and a retarded transmission through the lungs. Under this combined influence, if the heart should be organically unsound, it may suffer a fatal lesion, but our present inquiry relates to its inflammations. It cannot be doubted, I think, that the being subjected, frequently, to this distension of its right side, and inanition of its left, the circulation through its nutrient vessels being at the same time suspended, must of necessity disturb its vital properties, and predispose it to inflammation; and in this manner I suppose we may explain the well-known fact, that the efforts we are considering, are among the physiological causes of cardiac inflammation.

3. *Constrained Postures.*—Nearly connected with these causes, are certain constrained and sedentary postures, which act on the heart and great vessels mechanically. Tailors, shoemakers, and clerks, who bend long over the writing-table, are most obnoxious to injury from these causes; which seldom, I suppose, produce acute inflammation, and are oftener enumerated among the causes of organic disease than inflammation. They do, in fact, ultimately generate structural derangements, which, however, are only the consequences, as I suppose, of previous subacute inflammation. I have often seen a tailor slowly walking the streets of Cincinnati, with bloated visage and purple lips, but did not learn the early history of his case. I have already given that of an aged cordwainer, of the same city, in whom chronic carditis produced softening of the heart with fatal hemorrhage into the pericardium. The effects of these and kindred occupations will account in part for the greater prevalence of cardiac inflammation in old and populous cities than in the country.

4. *Cold.*—Another physiological influence may be assumed as a cause of this inflammation. I refer to cold, or cold and moisture, so applied to the surface of the body as to repel the blood from the exterior parts, and thus distend the great vessels and the cavities of the heart. This influence,

hemorrhage, are also a cause of inflammation. A case of this kind, in which no less than five small shot perforated the parietes of the organ and sojourned in its cavities, was reported by Dr. Leonard Randal, of Tennessee, in the year 1828.* The patient, a negro boy, fifteen years old, lived sixty-seven days after receiving the contents of a shot-gun on the left side of the sternum, about an inch and a half above its lower extremity. The heart was greatly depressed in its force, and very irregular in action for a week, when the external wound began to granulate, and in a month was cicatrized. The patient was now able to walk about, and seemed to be getting well, when, from eating a hearty meal, thoracic inflammation ensued, followed by hectic fever, and in five months he died. On dissection, the lungs, which had received many of the shot, were found extensively diseased. The pericardium showed adhesions to the heart and also to the pleura. The five shots had penetrated the organ about one-third of the distance from its base to its apex, and the wounds they had made were cicatrized. The heart appeared to be enlarged, and some portions of its parietes were almost cartilaginous. In the right auricle there were two detached shot. It did not show any lesion of structure. In the right ventricle, on which the enlargement of the heart depended, there were three also lying loose. The internal surface was of a dun color, and presented a thickening of the membrane, with a roughness resembling that of an ox's tongue. The state of the valves is not mentioned in the report. In this case there had been inflammation of all the tissues of the heart. How long the patient might have lived with the five shot in the right cavities of his heart, if his lungs had not been extensively diseased from other parts of the same charge, cannot be decided.

C. Pathological Causes.—The causes referred to the two preceding heads generate primary cardiac inflammation—those which belong to the present give us secondary or consequential cases, which are much more numerous.

1. A relation of mutual influence exists between every organ of the body and the heart. If any one be in pain, without hyperæmia, the heart sympathizes, and in general manifests its suffering by diminished force and increased frequency of contraction,—the pulse of irritation. If an organ be in the opposite state,—that of inflammatory hyperæmia,—the sympathy of the heart becomes febrile, and is displayed in augmented energy, quickness, and frequency of contraction. This is the condition into which it is thrown by all the phlegmasiæ, and especially those of important organs. The reaction of the heart in these cases is not directed specifically upon the organ which roused it into unnatural action, but upon the whole, as it consists simply in giving to the blood a greater velocity and momentum. Thus the various organs affect the heart through the innervation, while it affects them through the circulation. At present, we are only concerned with the

* Western Jour. (Cincinnati), vol. ii. p. 329.

of the hypertrophies of that organ which present themselves to us in this country, have this remote origin. They are, strictly speaking, tertiary affections. The gastritis produces carditis, and it occasions hypertrophy. The second results from sympathy, the third from valvular or pericardial lesion.

4. In chronic hepatitis the heart is deeply affected, but not often with inflammation. The defective elimination of the elements of the bile from the blood, or their absorption, from obstructed excretion, generates a state of constitutional depression and morbid sensibility, in which the heart deeply participates; but this condition rather opposes than promotes inflammation; nevertheless, a vigilant physician will not be unmindful of the possibility that cardiac inflammation of a low grade may be developed under such circumstances.

5. In pleurisy and pneumonia, the inflammation often *extends*, by continuity or contiguity of texture, to the pericardium. Obstructed pulmonary circulation may contribute to the same effect; and the intimate association of function between the heart and lungs may lead to a sympathy of the former with the latter. The supervention of cardiac inflammation on pulmonary is disclosed by *post-mortem* inspections, rather than by the symptoms during life, which are so mixed up with the pulmonary as to render analysis difficult. We must not suppose, however, that in all cases of pulmonic and cardiac inflammation combined, the latter is occasioned by the former, for the same remote cause may simultaneously excite both.

6. Pertussis now and then produces cardiac inflammation. In some cases, this may be the result of sympathy, in others of disturbed respiration.

7. The more formidable eruptive fevers, small-pox, scarlatina, and measles, are occasionally followed by inflammation in some of the tissues of the heart, as in other internal organs; an effect dependent chiefly perhaps on the sudden refluxes of blood from the circumference of the body, so common in those diseases.

8. The last pathological cause that I shall mention, is organic disease of the heart itself. Whether produced directly or remotely by inflammation, or the effect of lesions of nutrition only, organic derangements are themselves finally the cause of inflammation. Thus, in their advanced and fatal stages, that condition is liable to arise—a fact of which all who treat such cases ought to be aware.

I. We have seen that persons liable to rheumatism are very often affected with cardiac inflammation: between rheumatism and gout, there are many close analogies. In gout, there is a great development in the blood of lithic acid, which, seizing on the soda of that fluid, forms the tophaceous deposits of the affected joints, and it seems highly probable that there is an abnormal development of some acid, probably the lactic, in rheumatism. This, indeed, is asserted by Dr. Budd;* and, assumed as a fact by Dr. Furnival,† has led him to administer alkalies in acute rheumatism, as a means of averting inflammation of the heart, a practice which he has found eminently suc-

* Library of Med. vol. iv. p. 212. † London Lancet, 1844.

cessful. Simon* informs us that in this disease there is excess of lact acid. We may then admit among the probable causes of cardiac inflamm tion this morbid condition of the blood.

D. Causes connected with the Blood.—2. Observation and exper ment have demonstrated that many active substances, brought into conta with the pulmonic and alimentary mucous membranes, find their way in the veins, and are carried to the heart. Of their power, when thus applie to excite endocarditis, but little is as yet known. That alcohol, when a ingredient of our beverages, is thus introduced, cannot be doubted; an intemperance is enumerated by many of the systematic writers among th causes of cardiac inflammation. That it excites gastritis and hepatitis the can be no doubt, but whether the heart becomes affected from sympathy wit the stomach and liver, or from the contact of alcohol with its lining mem brane, is not known; perhaps in both modes.

3. Four *quasi* pathological conditions of the blood (not dependent o foreign matters introduced into it), deserve to be mentioned here. The are excess and deficiency of fibrine, and excess and deficiency of red cor puscles. How far the first by its action on the endocardium may contribute t promote inflammation is not known; but we are not at liberty to overlook th fact that in acute articular rheumatism, the absolute quantity of fibrine is i general greater than in any other disease, and no other (all others take together) so often excites endocarditis. Deficiency of fibrine appears to b generally connected with reduced energy in the heart, which *indicates* tha it cannot be a direct cause of inflammation. Excess of red corpuscles (con stituting plethora) gives as we have already seen a full pulse, and often ren ders the action of the heart irregular, but such symptoms do not necessaril imply inflammation; such a condition would however seem to be a predispo sition to that disease. Deficiency of corpuscles, or chlorotic blood, is ac companied by great irritability of the heart, and is perhaps never a direc cause of inflammation; but irritability often favors the production of in flammation, and may therefore sometimes be a predisposing cause to tha state in the heart.

SECTION VII.

SEQUELÆ OF CARDIAC INFLAMMATION.

The immediate or proximate effects of this inflammation have been indi cated under the appropriate heads. Some of the secondary and tertiary have also been referred to incidentally. It may be useful to present the whole in a single view.

1. *Proximate Lesions of Pericarditis.*—Partial or general adhesion of the membrane to the heart, and to the pleura—collections of serum, lymph, pus, and blood in its cavity—ulceration.

2. *Proximate Lesions of Endocarditis.*—Softening of the membrane,

* Chemistry of Man, p. 377.

especially its valvular folds, ulceration, laceration, deposits of fibrine on the valves, agglutination, contraction, immobility, vegetations, cartilaginous, and osseous transformations.

3. *Proximate lesions of the Muscular Substance.*—Suppuration, ulceration, aneurismal dilatation, softening, laceration, induration, gangrene.

If these immediate consequences of inflammation were the causes of all the organic degeneracies to which the heart is obnoxious, it would be natural and convenient to trace them out under the present head; such, however, not being the case, I prefer to bring the whole together under a different title, after the subject of inflammations has been disposed of, and will, therefore, in this place only enumerate such as are produced by the lesions just named.

They are chiefly hypertrophy and dilatation, separate or combined, in one or all the cavities of the organ, consequent on which as tertiary affections, are pulmonary inflammation, hemoptysis, and habitual dyspnœa, cerebral irritation, headache, vertigo, inflammation, apoplexy, palsy, hypochondriasis, melancholy, and suicidal monomania, biliary derangements, hydropic effusions, especially anasarca, hydrothorax, and hydro-pericardium, lastly gangrene of the extremities.

It is only necessary to recollect, that this frightful catalogue of diseases, organic and functional, may be the consequences of a few days of undiscovered or unskilfully treated cardiac inflammation, to realize the deep importance which attaches to a knowledge of its diagnosis, and to the timely application of remedies.

SECTION VIII.

CURE OF CARDIAC INFLAMMATION.

After what has been said in a preceding chapter, on the indications of cure and means of fulfilling them, in the phlegmasiæ generally, the treatment of particular species need not detain us long. This is especially true of that now under consideration, the efficient remedies for which are few and near at hand.

1. *Venesection.*—All experience declares that this is the first of our remedies, both in point of time and importance for acute cardiac inflammation. In deciding on it we must not be governed by the state of the pulse, for it will often be small, compressible, and weak, when the necessity for the lancet is most urgent. The first bleeding should be copious, but not carried to the extent of syncope, unless we are assured that the inflammation does not exist in the endocardium, for if it should, the temporary stasis of the blood in the heart would favor the deposit of fibrine on its valves. In cases of moderate intensity a single venesection may be sufficient; in the violent, the operation may be repeated once or twice. To the last the blood will be found sizy, especially when the disease is of a rheumatic origin. Indis-

pensable as this remedy is, the limit of its employment is less extended than in some other phlegmasiæ, for the reason that the sudden loss of blood augments the irritability of the heart, injuriously increasing its action while it diminishes its power.

2. *Local Bleeding.*—The contiguity of the heart to the parietes of the chest, seems to favor the beneficial influence of cups or leeches, and after the first or second bleeding they may be made to supersede the lancet, except in cases of great intensity, occurring in vigorous constitutions and unconnected with a rheumatic diathesis.

3. *Blisters* should never precede local bleeding, nor be applied very early in the disease, for their irritation might prove aggravating instead of revulsive. The discharge which they induce gives them an advantage over sinapisms. When the disease is of rheumatic origin, blisters may be advantageously applied over or near to the parts which have been formerly affected.

4. *Purging* to the extent of evacuating the existing contents of the stomach and bowels, should be effected after the first bleeding; but a continued repetition of cathartics as a means of reducing the vascular excitement is not judicious.

5. *Alteratives*, of which calomel and tartar emetic should be preferred, are among the most important remedies. Of the whole, calomel is the most efficient and may be administered in liberal doses at stated intervals until a salivation commences or the inflammation gives way. When tartar emetic is used, a quantity sufficient to nauseate may be prescribed, say one-fourth of a grain combined with each portion of calomel. The debilitating action of this medicine on the heart is greater than that of calomel, nevertheless its control over cardiac inflammation is less. Should pneumonia be complicated with pericarditis the value of tartar emetic will be greater.

6. *Saline Solutions.*—Nitrate of potash is not to be overlooked. Tartar emetic may or may not be added to its solution. It is well adapted to cases accompanied with a burning heat, or in which the secretion of urine is much diminished. When the inflammation is of a rheumatic origin, according to the experience of Dr. Furnivall, the carbonate of potash and other alkalies may be administered with benefit. They appear to act by neutralizing the superabundant acid in the blood.

7. *Narcotic Sedatives.*—Digitalis is a valuable medicine in this inflammation. I have always used the tincture as acting more on the heart and less on the kidneys than the infusion. It may be advantageously combined with a solution of tartarized antimony. It will not be proper to give more than a drachm in twenty-four hours, and that quantity cannot be safely continued for more than three or four days. The irregularity of the heart's action, when inflamed, deprives us of one of the means of judging when the system has been pushed far enough, and renders caution necessary. In the declining stages of the disease, and during convalescence, the medicine, in small doses, will be found beneficial, as subduing the remains of inflam-

matory action. Colchicum may be substituted for digitalis, and is no doubt preferable to it in rheumatic carditis. In such cases it may indeed be regarded as an appropriate medicine; and its influence on the heart, under an excessive administration, is less dangerous than that of digitalis. It acts, moreover, on the mucous membrane of the bowels, producing revulsion, and serous secretion.

But of all narcotic sedatives, opium is the best, fulfilling, beyond every other medicine, the important indication of allaying the morbid irritability of the heart, and moderating its excessive action. This violent action aggravates the inflammation which occasions it, and deserves, on that account, the anxious attention of the physician. It is a great mistake to suppose that opium should not be administered till the inflammation is subdued. After one bleeding, and the operation of a single cathartic, the administration of opium may commence, and should be continued throughout the whole attack. All experience proves that added to calomel it increases the antiphlogistic power of that medicine; it may also be combined with tartar emetic, digitalis, and colchicum, to the last of which it is an adjuvant of the greatest value. With calomel, solid opium or Dover's powders may be combined: with the other medicines, laudanum. I do not know that the sulphate of morphia possesses any advantages over these preparations.

8. The influence of food, locomotion, speaking, and mental excitement, over the action of the heart is so great, that, in this disease, abstinence, rest, silence, and exclusion of society are indispensable.

Thus far I have supposed the physician to have been called before valvular or pericardial lesions, to any considerable extent, had taken place; but in a majority of cases he will not have this advantage. If the case be endocarditis, the lining membrane, especially that covering the valves, will not only be more or less softened and swelled, but deposits of lymph and fibrine will have commenced. These lesions, however, will not demand any modification of the treatment. If the inflammation be pericardial, and has not been promptly met, the creaking sound which indicates slight roughening of the membrane, and incipient effusion of lymph, will not suggest any modification of the treatment, but rather admonish the physician to great energy of antiphlogistic treatment. But if the dulness under percussion should be great in tone and extent, and the normal sounds of the heart are heard as from a depth, and there is no friction sound, copious effusion is indicated. In this stage of the disease venesection must be more sparingly employed, and greater reliance be placed on local bleeding, or blistering. The latter is especially beneficial, not only by producing revulsion, but exciting absorption of the effused fluid. Even now, however, experience shows that a mild mercurial course is frequently of great value. In connection with, or following upon it, the infusion of digitalis, combined with spirit of nitrous ether, and diluted with any kind of diuretic tea, will be found useful by promoting absorption, while it subdues the remains of inflammation. To the same end,

a course of hydriodate of potash, in five grain doses, three times a day, may be employed. Should the debility of the patient be great, and the signs of inflammation few and feeble, the iodide of iron is preferable; to which the bark and other bitters may often be advantageously conjoined; especially when the inflammation has been rheumatic. When the pericardial accumulation is great, and absorption takes place slowly, the actual cautery applied to the precordial region, is regarded by many physicians as a valuable resource. I have not employed it. Throughout this treatment, it is of great importance to keep down the irritability of the heart, for which purpose opium or hyoscyamus may be used at night. To the narcotic given at this time it will be proper to add a sudorific, or, as combining both, to administer Dover's powder, and also to adopt other means, for restoring the functions of the skin. It is equally important to reproduce those of the liver, if they have been impaired, a condition not very likely to exist, however, after the gentle mercurial course which such cases require.

A diminution in the area and dulness of sound under percussion, will show the progress of absorption, which will be nearly completed when a friction sound is heard through the stethoscope. In many cases the effusion is not so great but that it is audible under a spontaneous absorption of the thinner parts of the lymph. Whenever it exists, the danger of adhesion of the pericardium is imminent. Under such circumstances, a complete subdual of the inflammation, and the promotion of rapid absorption, that the fibrine itself may be removed before it becomes organized, constitute all that art can suggest, and more than can generally be accomplished.

If the effusion into the pericardium should have been blood or pus, the means enumerated will be most likely to promote its absorption; but in both cases serious lesions will remain. The fibrine of the blood will, in all probability, cause an adhesion of the pericardial walls; and the same result will follow on the absorption of the pus, unless prevented by one still more serious, ulceration, for which nothing but a restorative treatment can be advised.

Notwithstanding its adhesions, the pericardium is liable to renewed attacks of inflammation, which, however, are said not to be so violent as the first. If the adhesion is so general as to obliterate the sac, new effusions cannot of course occur; but when they are partial, the original condition may be reproduced, and the obliteration of the cavity completed. The consequences of this lesion, as well as that of the valves, will be discussed in the chapter on organic diseases of the heart. [Like so many more chapters, alas! never written.]

"Eheu fugaces! Postume, Postume,
Labuntur anni: nec pietas moram
Rugis et instanti senectæ
Afferet, indomitæque Morti."
Hor. Lib. II. Carm. xiv.

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